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# The ADVANCEMENT OF SCIENCE

Vol. IV, No. 13

Annual Meeting 1946

Future Meetings

Civilisation and the Pursuit of Knowledge
PRESIDENTIAL ADDRESS

Dissemination of Scientific Information to the Public
CONFERENCE

UNESCO and the Universities
CONFERENCE

Future Pattern of the Work of the Association

Council's Report to General Committee, July 1946

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# THE ADVANCEMENT OF SCIENCE

## PROSPECT

SINCE the last number of *The Advancement of Science* appeared, the British Association has held its first post-war annual meeting, and two conferences which are reported in this number. Though the period of transition from conditions of war to conditions of peace cannot be said to have ended at any particular moment, and it is certainly true as regards the activities of the Association that the transition period is not yet over, the resumption of annual meetings is a significant occasion, and it seems appropriate at this time to comment on a number of events and developments which are here separately recorded and which take their place in the history of the Association, and some of which may indeed substantially affect its future.

### THE ANNUAL MEETING

ANNUAL meetings of the Association have been held without intermission except during the war of 1914–18 and the late war. Less than twelve months after the Armistice of 1918 there was held in Bournemouth a full and very successful meeting, but, despite the best of intentions and considerable effort by those concerned, it was found on the present occasion that physical damage and general restrictions and dislocations arising from the late war made it impossible to contemplate the organisation of a normal annual meeting in 1945 or 1946.

To their great credit, the Association Française pour l'Avancement des Sciences were able to arrange a Victory Congress in Paris in 1945, as reported in the preceding issue of this Journal. It was not to be contemplated that the British Association should fall short in 1946, or that conditions should be accepted as inevitably postponing a resumption of at least part of the normal pre-war activity of the Association. A meeting was accordingly arranged to take place in London, where there were facilities for a limited programme.

The date of July 20, which was unusually early, was selected with reference to the presence in London of delegates to the Empire Scientific Conference, the Newton Tercentenary Celebrations, and the first post-war meeting of the International Council of Scientific Unions. Apart from the Presidential Address and business meetings of the Council and General Committee, the Annual Meeting provided opportunities for social occasions at which it was a pleasure to entertain foreign delegates, including officials and representatives, who were particularly welcome, from Associations for the Advancement of Science in America, Australia and New Zealand, Canada, France and South Africa, and from the Indian Science Congress Association, with all of which the British Association has always had the most cordial relations. Overseas visitors attending the meeting numbered 109 from 31 countries.

The meeting took place against a background of intense and purposeful activity on the part of distinguished men of science gathered from all parts of the earth, in a spirit of unity which admits no political frontiers, to take stock of the position of science and scientists in a world considerably changed since 1939, and to discuss measures not only for increasing scientific knowledge and co-ordinating the efforts towards that end but measures also for promoting the right use of that knowledge for the well-being of mankind.

This was the tone of a loyal message addressed on behalf of the Association to His

Majesty the King, who, in reply, said that never had the advancement of science been more important and never had it been ' more urgent for our welfare and for that of the world at large that the road which that advance follows should be the right one.'

In his presidential address on Civilisation and the Pursuit of Knowledge, Sir Richard Gregory, having described the unceasing quest for knowledge in relation to the development of civilisation, rejected the assumption that scientists, any more than other groups of people, desired to be associated with the prostitution of knowledge in any form, and issued a challenge to men of goodwill everywhere, whatever their convictions about the meaning and purpose of man's existence, to make the best possible use of their heritage by the exercise of all their talents, and thus to help to make the earth ' part of the heavens of the Universe in spirit, as it already is in truth.'

## The Future Pattern of the Association's Work

In his statement on the Accounts for the year 1945–46, the General Treasurer said that the Association ' has come through a great crisis in its existence and has emerged into a new world, to which it must adapt itself,' and on another page is printed a memorandum by the retiring permanent Secretary, which formed the basis of discussion by the General Committee on the future pattern of the Association's work. It has been remitted to the Officers and Council to keep this important question under review, and to put into effect any measures which will consolidate the position held by the Association and extend its scope in such a way as to further its mission. Without prejudice to any decisions which the Council may take, it can be said that there are a number of ways in which the Association can and should modify its programme and enlarge its scope to meet present-day requirements. They may be classified into those which can be undertaken without cost, and those for which an accretion to the funds of the Association would be necessary.

In the first category is the suggestion that programmes of the annual meeting should be modified to include more topics of general interest and fewer specialised transactions. Before the war, programmes were developing in that direction, and in the intervening years the Division for the Social and International Relations has provided a forum for the discussion of many current topics of more than sectional academic interest. The trend towards inter-sectional discussions can no doubt be accelerated without too drastic a change in the character and atmosphere of the meetings.

In the second category are proposals, including the establishment of a Bureau of Scientific Information, which involve increased subsidies for their accomplishment, and better office accommodation than is at present available. The extent to which the Council can develop new activities of the Association will depend on the financial support it can secure. It is probably an inescapable fact that developments such as an Information Bureau, or better offices for the secretariat, will require special funds for their establishment if not for their maintenance, but on the other hand the balance of opinion appears to be in favour of the view that the activities of the Association should be based on a steady income from increased membership rather than an accumulation of special funds. Quoting again from the report of the General Treasurer: ' The resumption of Annual Meetings will presumably restore our membership, but something more than a return to pre-war membership will be needed if the Association is going to be able to continue to carry out all its responsibilities as one of the oldest and broadest Scientific Institutions, with the tradition, organisation and contacts which must be used to the full if all the aims and objects of scientists to play a fuller part in the life of the community are to be realised.'

## Bureau of Scientific Information

The proposal to establish a Scientific Information Bureau is not new. Similar suggestions have been mooted over a number of years, but the old arguments in favour of such an organisation have recently been renewed with greater emphasis and wider support following the developments of the past few years, and the Association has received from a representative Conference, whose proceedings are reported in this number, a direct appeal to establish the means for ensuring that the public are provided with authenticated scientific information. This proposal is receiving close attention by the Council.

## UNESCO and the Universities

The Report of the Association's Committee on Post-War University Education was published in 1944 (*The Advancement of Science*, Vol. III, No. 9), and has been widely read both in the Journal and in offprints. Had there been a normal meeting this year, it would have been discussed by Section L (Education), but as events, particularly with reference to international relations, were moving so fast, and discussion could not be delayed till the 1947 meeting, it was decided to hold a separate conference to consider the

report, with special reference to the international aspect of university education in view of the development of UNESCO.

The proceedings of the conference are reported in this number. The Association aims, among other things, to assist progress by discussion and report, and it is hoped that both the occasion and the reports may have contributed usefully to current thinking on what a university is and does, or should do within its own walls and outside them both regionally and internationally. Action now rests with those directly concerned.

### London Traffic and the London Plan

By the time this appears in print a conference arranged by the Association on September 12–13, 1946, will have taken place on London Traffic and the London Plan.

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# ANNUAL MEETING OF THE BRITISH ASSOCIATION, 1946

### Report on the Proceedings

As was announced in the previous number of *The Advancement of Science*, it was found to be impossible to arrange an Annual Meeting on the lines of the pre-war meetings in provincial cities. It was arranged, however, to hold a short meeting in London, and this took place on Saturday and Sunday, July 20–21, in accommodation generously provided by the British Medical Association and the Geological Society, and at Down House. The proceedings may be briefly summarised as follows :

On the morning of July 20 there were statutory meetings of the Council and of the General Committee. At the latter the business included the following : (*a*) election of President for the year 1947 ; (*b*) election of Council and General Officers ; (*c*) arrangements for future annual meetings ; (*d*) discussion on the future pattern of the work of the Association.

The President and Council and a large number of members entertained Empire and foreign delegates to luncheon at Claridge's. The President proposed the toast of ' The Guests,' and Sir David Rivett (Australia) and Col. Lynne Fullerton (American Embassy) replied.

In the afternoon, in the hall of the British Medical Association, and before a large and distinguished audience, Sir Richard Gregory delivered his presidential address on Civilisation and the Pursuit of Knowledge, which is reported in full at p. 7. The address was recorded for radio transmission by the B.B.C. Votes of thanks were proposed by Sir Henry Dale, seconded by Lord Samuel.

In the evening the President and Council received members and guests at an informal reception held in the rooms of the Geological Society at Burlington House.

On the afternoon of Sunday, July 21, a large company of members and guests attended a Garden Party at Down House, which is maintained by the Association as a national memorial to Charles Darwin.

On the occasion of this first post-war annual meeting, the following message was sent to H.M. The King :

Your Majesty,

In September 1939 the imminence of war forced the British Association to break off its annual meeting, and when doing so we addressed to Your Majesty as our Patron an expression of our loyalty. Now, at the first annual meeting to be held since that date, we beg leave to submit our humble congratulations on the achievement of victory.

Your Majesty's interest in researches which add to the store of scientific knowledge and in the moral obligations evoked by their applications, will stimulate endeavour in all fields of thought and action associated with the material and spiritual advancement of the human race. It is a primary object of the British Association to help towards that end by promoting general understanding of the right uses of scientific knowledge, in order that this may be neither neglected nor misapplied.

R. A. Gregory,
*President.*

*July* 20, 1946.

His Majesty was pleased to reply as follows :

To the President,
British Association for the Advancement of Science.

I should be grateful if you would express to the members of the British Association my sincere thanks for their kind and loyal message, the terms of which I greatly appreciate.

On personal grounds, I am very glad to know that the Association, with which my family has been so long connected, has resumed its annual meetings, interrupted

seven years ago by the outbreak of war. But I welcome that resumption still more on wider, national grounds ; never has the object for which the Association was formed—the advancement of Science—been more important, and never has it been more urgent, for our welfare and for that of the world at large, that the road which that advance follows should be the right one.

I send my best wishes for the success of your meeting and of the work to which it will lead you.

GEORGE R.I.

*July* 20, 1946.

Sir Richard Gregory read these messages to the meeting before delivering his address.

At the close of the session he announced that the General Committee had that morning elected Sir Henry Dale, O.M. G.B.E., F.R.S., to succeed him as President as from January 1, 1947.

---

# FUTURE MEETINGS OF THE BRITISH ASSOCIATION

AT its meeting on July 20, 1946, the General Committee accepted invitations to hold annual meetings in the following cities :

DUNDEE—August 27–September 3, 1947.

BRIGHTON—September 8–15, 1948.

NEWCASTLE-UPON-TYNE—1949.

BIRMINGHAM—1950.

Previous meetings of the Association have been held in these cities as follows : Dundee, 1867, 1912 and 1939 ; Brighton, 1872 ; Newcastle-upon-Tyne, 1838, 1863, 1889 and 1916 ; Birmingham, 1839, 1849, 1865, 1886, and 1913.

Before the war the Association carried on its Register the names and addresses of some 10,000 people, including intermittent supporters as well as regularly subscribing and life members. Every effort is now being made to verify or revise register entries as necessary, and for this purpose a communication will be addressed to members whose subscriptions have lapsed, inviting them to renew their support and also to notify the office of the Association if they wish to receive the preliminary programme of the Dundee Meeting.

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## THE PRESIDENTIAL ADDRESS

# CIVILISATION AND THE PURSUIT OF KNOWLEDGE

BY

SIR RICHARD GREGORY, BT., F.R.S.

SINCE the Annual Meeting of the British Association at Dundee in the year 1939 was brought to an abrupt end by the imminence of war, it has been neither desirable nor possible to bring members together for another meeting of the usual kind in Great Britain or Overseas. Even now, a year after the armistice, conditions are such that accommodation for all our Sections and their members at Newcastle or Birmingham, where, but for the war, we should have met in 1940 and 1941, is impracticable, on account of the devastation which these cities have suffered from enemy action. Next year, however, the series of Annual Meetings which was begun in 1831, when the Association was founded, will be resumed at Dundee, and the broken parts of the chain will again be linked together.

This year's assembly is, therefore, of a token character and is limited to a single day instead of the week usually occupied in the presentation of scientific papers and the delivery of addresses before the various Sections. By the Statutes of the Association it is laid down that an Annual Meeting shall be held and that the President shall deliver an address at such a meeting during his year of office. For a number of reasons these two obligations could not be met during the period of the war, though I have been re-elected to the Presidency every year since 1939, when this high honour was bestowed upon me.

The intervening years have, however, been very usefully employed in the preparation and presentation of reports by Research Committees appointed by the Council and by a number of public conferences on scientific subjects of wide interest. The Conferences were organised, with the approval of the Council, by the Division for the Social and International Relations of Science, which was founded at the Cambridge meeting in 1938 with powers to arrange such meetings at times or places other than those of the normal Annual Meetings. Beginning with a Conference on 'Science and World Order,' held in September, 1941, and attended by representatives of more than twenty of the United Nations, a number of other Conferences were arranged, the last being on 'Scientific Research and Industrial Planning,' held in December, 1945.

All these Conferences were concerned with aspects of modern science in relation to the outlook and service of contributors to the advancement of natural knowledge and their contacts with problems of progressive human development. This is the cause to which my chief thoughts and work have been devoted for the past fifty years, and for the promotion of which the British Association has always stood. As it is the custom of Presidents of the Association to deal in their annual addresses with subjects which have long occupied their close attention, I cannot do better than follow the usual practice, in this swan-song of retirement, by taking as my theme 'Civilisation and the Pursuit of Knowledge.'

### THE DAWN OF CIVILISED MAN

The nature, origin and evolution of life, and the endeavours of man to understand it and the place in the universe of the world in which he lives and has his being, have been discussed on many occasions at meetings of the Association. In his Presidential Address at the Dundee meeting in 1939, Sir Albert Seward used existing knowledge to reconstruct a view of plant life on an ancient land

of which Scotland is now a remnant, and 60 million years before it was inhabited by man. Even this long period dwindles into insignificance in comparison with that of more than 2,000 million years which have elapsed since the earth took geological form in the astronomical universe.

Organic life has existed upon the earth for about 1,200 million years, but *Homo sapiens* as a product of its evolution can be traced back to a stage of less than 100,000 years. An impressive illustration of this short period of human tenancy was given in an address by Prof. James Ritchie as President of the Section of Zoology at the Dundee meeting. Taking the twelve hours on the dial of a clock to represent the span of 1,200 million years, early forms of life would cover the period from midnight to seven o'clock. From this hour until 11.15, fishes and amphibia, reptiles, birds and mammals would successively develop and predominate, with primitive man making his appearance at less than a minute before noon, and our own species less than a second and a half ago. On this time-scale, the period from our Neolithic ancestors of about ten thousand years ago to the present epoch is represented by about one-third of a second.

It is usual to date civilisation from those times of the New Stone Age, when men began to cultivate food-crops, care for and breed domesticated animals, make polished flint implements, produce the potter's wheel and the plough in their simplest forms, use boats for movement on water, undertake spinning and mining, and provide by artificial means for the primary needs of communal life—food, shelter and clothing. There are still a few groups of human beings who have not advanced beyond these primitive conditions of life, but as they have not progressively improved these conditions, they cannot be said to be civilised in the sense in which the word is now understood.

## What is Civilisation ?

What civilisation actually means depends upon the values attached to thoughts and works by which man has separated himself from his purely animal ancestry. In Johnson's time, the word was used only in a civil or legal sense and not as a measure of material, moral or intellectual attainment. Each of these elements of development can be a dominant characteristic of a human society in a particular region or period ; and when they are combined to reach a high standard for the general good, the best type of social organisation may be said to have been reached.

If civilisation is regarded as a formative process, then a new era began when Neolithic man became a tool-using animal, with the desire to acquire new knowledge and apply it to improve the mode of life of himself and his fellows. Its roots are in the human mind and its character is determined by the aptitude to accept ideas and give effects to them. The courses of development of material resources, of morals and religion, of language and other means of emotional expression, differ in time and place, but the creative or receptive agent is always the human mind. Refinement of manners and customs is commonly associated with conventional class distinctions but these characteristics cannot rightly be said to provide essential standards of advance in civilisation. A better measure is afforded by the proportion of the community who participate in the general welfare and appreciate the opportunities provided for their physical comfort and intellectual culture.

Civilisation is thus a continuous process, which for the present purpose may be said to have begun with the art of agriculture in the Near East about ten thousand years ago, and at an early date to have reached Britain with the potter's art. The first steps in the working of metals such as gold and copper seem, however, to have been made in the Nubian region of North-east Africa. At one time, therefore, the negroid branch of the human race could be said to have been in the van of civilisation both in its art and material culture. When given opportunities for development, coloured people have proved themselves just as capable of creative thought and efficient action as the white or other groups.

It is indeed unwarrantable to assume that any group of individuals or racial types are superior to others solely because they possess greater wealth or power. There are many types of civilisation but none provides standards of highest attainment in every field of human thought and endeavour. In the past, each has had its rise and fall, sometimes because of climatic or other natural changes, but more often through the use of superior military forces and the subsequent occupation and administration of the vanquished territory. They all belong to the panorama of structures of human societies and take their separate places in the continuous record of the world's history, beginning with the advent of the New Stone Age about ten thousand years ago.

## Inquiry and Interpretation

In the study of man and his activities, three types of cultural development may be recognised ; and they are all measured by different standards. In the fine arts the imaginative

qualities of the mind appeal primarily to the emotions through stimulation of the aesthetic judgment, with feeling rather than reason as the standard of value ; material culture is the province of mechanical arts ; and science—the domain of reason—is systematic and formulated knowledge in all fields of human understanding—natural, moral, social, and political. Natural science, or natural philosophy, is only one division of science as thus defined ; yet, by general usage, the single word now signifies organised natural knowledge. The history of civilisation from this point of view is a history of intellectual development in which science has been the chief factor in changing habits of thought from superficial observation and speculative and anthropomorphic theories of causation to clear concepts, rational conclusions, and progressive principles in the advancement of man and society.

In the most primitive times man had to acquire knowledge of the world of Nature around him in order to survive. The effort to secure the food and shelter necessary for his existence demanded a never ceasing exploitation of the resources of his environment for the progressive improvement of his material equipment—an equipment which he learned to turn against his fellow man, no less than against the animal world upon which he preyed for food and clothing, or against which he must defend himself.

In this struggle, even more than on his personal prowess, his skill, and the bringing of food-plants and animals into his service, man relied upon his imagined understanding of, and his supposed power to control, the hidden causes of the nature and behaviour of the beings and objects of his world ; in other words, he believed that natural conditions and events could be modified by the medicine of magic. Though the magical beliefs of primitive man may seem to us vain and crude, they should not be despised ; for in these blind gropings to probe causation in Nature, may be seen the remote and humble beginnings of the urge to the understanding of the universe, which is science.

When, however, magic is understood to be the practice of the pretended art of influencing the course of natural events by compelling the agency of spiritual beings, or by bringing occult principles into operation, it is more closely related to religion than to science. Art became associated with magic and religion many thousands of years before the era of the New Stone Age which has been taken as the beginning of civilisation of human societies. Thirty thousand years or so earlier, realistic paintings and drawings were made on the walls of dark caves, and objects were carved on bone and ivory, or fashioned in clay. They still remain to afford the earliest tangible evidence of that spirit in man's nature which was to act as his guide, both for good and ill, in his upward progress towards the most advanced stages of development to which civilisation has as yet attained.

There are several views as to the nature of the urge which led to these manifestations of early cultural development. One is that early man, like his counterpart, the backward peoples of modern times, believed that, by the exercise of his ability to represent his desires in graphic form—in other words, to effect his purpose of controlling those forms of animal life upon which he depended for his food-supply—he was setting in motion forces more potent than his own to that end, and making of his painting and carving an act of magical invocation, or it may be of religious observance.

Even if nothing more than a magical significance be attached to these realistic representations—cave-bear, mammoth or bull, the browsing deer and the vital energy of a galloping herd of horses, and the like—certain other examples of this artistic activity afford evidence of ideas which can be placed within the category of religion, if only of a rudimentary type. Some of the figures are forms of men with heads masked as animals, such as appear in representations of gods in ancient Egypt and Babylonia. They are regarded, therefore, as evidence of early conceptions of a spirit—even of a divinity—in animal form and are associated with worship and supplication, whether for material desires or as ceremonial connected with a cult of the dead.

## Worship and Works

By Neolithic times our direct progenitors gave expression to certain clear conceptions of their belief in a form of existence after physical death and made provision for it in graves during the ritual of interment. Bodies were laid in particular positions with reference to the rising or the setting sun ; and for the continued sustenance of the spirit, food was provided, with weapons for its protection, ornaments as amulets to ward off evil influences, and when human sacrifice was a part of the ritual, slaves to administer to its needs. Whatever the origin of these and other spiritual beliefs, the practice of them marks a distinct stage in the development of man's mind and works and has always played a potent part in shaping the structure of civilised life.

From one point of view, worship in the sense of adoration or reverence of the spirits of ancestors represents recognition of particular qualities of human nature and the

desire to maintain them. When these qualities are conceived to be possessed supremely by supernatural beings, religion assumes a wider and more purposeful meaning. It becomes an attitude of mind towards the mysterious, with instinct as its basis and intuitive feeling as the standard of value. Religious experience can claim to be positive knowledge just as much as facts which appeal to the physical senses can be said to represent ultimate reality. As factors which have influenced human development throughout all stages of civilisation, religion and science are inseparable, but it cannot be said that the two systems of thought have the same rates of rational advance, whether in principles or practice. Each is concerned with the pursuit of truth, whether for its own sake or for increasing the contacts of human life with things and forces, visible and invisible, in the heavens and on the earth.

The light of truth is a spectrum of many colours to which human consciousness is receptive in varying degrees. In the physical sense light does not become manifest until it is reflected by matter, and in the sense of a divine influence its truth has to be perceived spiritually. It is through the study of the heavens and the earth from these two points of view of worship and inquiry that religion and astronomy meet in celestial fields.

All living things upon the earth depend upon the light of the sun for their origin and growth. Many millions of years before man appeared, there were song-birds which did homage to its power in paeans of thanksgiving at the passing of darkness and the coming of dawn. This form of salutation may be regarded as the beginning of instinctive reactions to the influence of light, which in man became worship and religious observance. With the recognition of the sun as a great power station having a deity in charge came the association of light with life and goodness, and darkness with death and evil. Whether these higher abstract qualities attributed to celestial beings are reflections of what are observed and admired in human communities or reactions to divine influence is a question which cannot be answered by verifiable knowledge and must be left to individual consciousness for judgment.

## Celestial Movements and Meanings

When the apparent movements of the sun and moon were used to measure intervals of time and seasons, the knowledge gained was intended for practical service and not as a contribution to rational or abstract truth. Astronomy was then the handmaid of astrology, which associated human lives and affairs with particular parts of the celestial sphere and the deities who occupied them. Astronomy is still the science of the heavenly bodies, but these are studied as physical objects and not as living beings. An immense amount of precise knowledge of celestial phenomena and events was obtained in ancient Egypt and Assyria, and its factual value is not affected by interpretations given to it. The accumulation and correlation of all such natural knowledge acquired by observation or practical experience is the function of science, while the way in which it is applied and interpreted affords a measure of the strength of a community in the history of civilisation.

The association of astronomical objects and events with religious and other festivals, and with theological teaching, is a characteristic of most early civilisations, and is expressed in much of their art and literature. It is closely connected with the culture of Egypt and Mesopotamia, and also occupies a prominent place in the sacred literature of India. Among the material taken over by the Greeks from the Babylonians were the zodiac, knowledge of the planets and their courses among the constellations, and a method of predicting eclipses by means of the cycle known as the Saros—a period of eighteen years, eleven and one-third days. In this period, solar and lunar eclipses recur in a regular sequence at the same intervals of time and can, therefore, be predicted. Knowledge of the period descended to the Chaldeans, who occupied a part of Babylonia, and was transmitted by them to the Greek and Roman worlds.

When particular facts about phenomena or events reveal relationships from which no exceptions are known, they are expressed as scientific truths, and in this sense represent natural principles or laws. By discovering from the accumulation of observations during many centuries that 223 lunar months correspond with 18 years, $11\frac{1}{3}$ days, or just over 6,585 days, the Chaldeans were able to announce the ' Law of Eclipses ' as a natural and verifiable truth. This, like the regularity of the returns of the sun and moon and unchanging groups of stars, was a striking example of law and order in Nature whatever views were held as to its cause or purpose in the scheme of human life.

Another cycle, not to be confused with the Saros, which relates only to the prediction of eclipses, was discovered in the fifth century B.C. by a Greek mathematician, Meton. He found that there was the same number of days, within a couple of hours, in 19 solar years as in 235 lunar months. This relation was regarded as of such importance that it was inscribed in letters of gold from 1 to 19 on Greek monuments and

was called the Golden Number. For more than a thousand years the Metonic Cycle has been used to determine the date of Easter, upon which all the movable feasts of Christian Churches depend. As this date is determined also by that of the spring equinox, both the sun and the moon as seen from the earth are involved in it, but by the use of the simple cycle of Meton its prediction becomes relatively easy. The point of particular interest is that astronomical observations and measurements originated the dates of the chief religious festivals from the earliest civilised times to the present day.

Reactions to influences of objects and phenomena of the heavens upon conditions of life on the earth thus connect both the physical and emotional parts of human nature. Interpretation of their causes depends upon the attitude assumed towards mysteries and the light of knowledge. Their creation and maintenance may be regarded as divine designs available for the service of mankind or as elements and forces in a universe in which the earth is but a particle. The view that celestial objects are the sources or symbols of vital force or forces appears at the very dawn of civilisation as the foundation of the great religions of the world. It was expressed in the faiths of ancient Egypt and Assyria by impressive ceremonies in magnificent temples.

Knowledge of the constellations seems to have come to the Greeks through the Phoenicians, and was brought into practical service by its use in navigation. Homer refers to certain stars as having been sent by Zeus as portents for mariners. There are many other references to constellations in the Homeric epic poems, which describe conditions of life and thought in the period of the ninth and eighth centuries B.C. Hesiod, who succeeded Homer, gave more details of the guidance for farming operations afforded by the appearance of particular stars at different times of the year. He regarded the Iron Age, which was then beginning, as degenerate in comparison with the earlier Bronze and Stone Ages when man lived in perfect innocence in a veritable Garden of Eden. The works of both Homer and Hesiod portray stages of civilisation when the affairs of deities were believed to be much the same socially as those of human beings, with little difference in their qualities or actions. Heaven and earth were thus brought together in spiritual as well as practical service, and heroes became divinities in celestial abodes.

In Indus valley civilisation the Aryans, when they invaded the country not later than the middle of the second millenium B.C., brought with them concepts which personify the forces of Nature as divine and spiritual beings. Their attitude and outlook are embodied in the hymns of the *Rigveda* which date from about 1200 B.C. and were developed in the treatises known collectively as the *Upanishads*, or conferences, in about the same period as that of early Greek philosophy. The belief in the personified natural forces of the Vedas was finally carried so far as the creation of an organised polytheism or pantheon and an elaborated caste system of society in which the Brahman was supreme instead of the warrior of the Vedic classics.

### Natural Knowledge and Philosophy

In this early philosophy, man is the centre of the cosmic scheme and he shares the vital force with the gods, without being dependent upon them, though they possess it supremely. He differs from all other things, animate or inanimate, in the capacity for thinking, leading eventually to the Brahmans becoming the 'head' of the social organism because they possessed it to a higher degree than other classes, including the warriors, whose powers depended upon the use of 'lower' parts of the human body. Brahmanism became a new Hinduism with the teaching that every Hindu could share this knowledge and by mystical thought attain to the same perfection. Many variations of these beliefs have been formulated and incorporated in Hinduism, but the main ideas remain the same. With the introduction of Buddhism in the sixth century B.C., came the teaching that the performance of sacrifices and daily rites to deities were no measure of attainment of the right way of human life and conduct. Since that time Hinduism and Buddhism, together and separately, have determined the course of civilisation in the Middle and Far East.

It is a remarkable historical fact that the sixth century B.C. was a period of great emotional and intellectual ferment, in which there was displayed a general and widespread interest in religious and philosophic speculation, particularly in the East. Buddhism, Taoism, and Confucianism, all had their origin in that century; and their followers to-day number more than half of the population of the world. There is no personal god in these religions or ethical systems, but conceptions of relationships between the heavens and the earth, or the universe and man, are common components of them. Each is concerned with a way of life and the exercise of human virtues, and each is tolerant of the others. It is thus possible for the three cults, with Christianity in addition, to be accepted together as guides to individual conduct, without discrimination between them.

Though there are decided differences between the principles of Taoism and those of Confucianism, each system makes ethical conduct its chief object, and neither is associated with fanaticism against other religions. The cult of ancestor worship in China has no mythological motive, but expresses the philosophical conception that continuation of life lies not in the immortality of the soul, but in the perpetual remembrance of the righteous by mankind. The original teaching of Taoism has, however, been modified by contact with Buddhism, and Lao-tze, its founder, has become one of a trinity of deities in a mystical pantheon. While it is possible to say simply of Buddhism that it was concerned with the way of salvation of the individual, Confucianism, which is synonymous with Chinese civilisation, aimed at the regeneration of a whole society through a reformation in the conduct and character of all its members.

Just as in the sixth century B.C., Buddhism, Taoism and Confucianism separated man from celestial deities, so in the same period the Greek philosophers Thales and Pythagoras began the study of Nature as made manifest to the senses with the view of discovering relationships between effects and causes. They and their Ionian school were the first 'lovers of wisdom' to separate natural philosophy from all-personifying religious faith and to constitute a method of interpreting Nature distinct from the primitive conceptions of unenlightened minds. The idea of Person in a divine sense was tacitly set aside or limited, and an impersonal Nature conceived as a separate subject of study. The scope of natural philosophy, with its objective character and invariable laws, discoverable by a proper and methodical application of the human intellect, was thus defined. Though these principles were not maintained for long, they opened up those veins of speculative philosophy which occupied afterwards so large a portion of Greek intellectual energy, with most enduring results on Western Civilisation.

Plato, the greatest of these thinkers, opposed the scientific school which had arisen to study natural objects and phenomena apart from supernatural agencies and to endeavour to interpret the processes involved by submitting them to independent rational inquiry. It was against these materialists, of whom Democritus of the fifth and fourth centuries B.C. was the leader and last of the physical school, that the main arguments were advanced by the Socratic system of reasoning in the tenth book of Plato's *Laws*. Disregard of the gods, or unbelief in their concern for human affairs and conditions affecting them, was held to be a danger to a State and a crime to be denounced by every law-abiding citizen and punished severely.

The words used by Plato near the beginning of the discourse express very clearly the difference between the scientific and theological attitudes towards the pursuit of natural knowledge; and they are to-day as truly typical of the two points of view as they were in the first recorded statement of conflict between religion and science.

'It is the novel view of our modern scientists,' said Plato, 'that we must hold responsible as the cause of mischief. For the result of the arguments of such people is this; that when you and I try to prove the existence of the gods by pointing to these very objects—Sun, Moon, Stars and Earth—as instances of deity and divinity, people who have been converted by these scientists will assert that these things are simply earth and stone, incapable of paying any heed to human affairs, and that these beliefs of ours are speciously tricked out with arguments to make them plausible.'

This denunciation of the mode and meaning of the studies of the early Greek physicists has particular interest at the present time: for it was directed against Democritus, the renowned founder of the atomic theory. It is a tribute to the free intellectual atmosphere of Greece at the time that such an impious theory should have been conceived at all. In its crude form the Athenian, Epicurus, used the theory as the basis of ethical teaching in which divine providence had no part; and it was expounded by Lucretius to the Roman world in his comprehensive philosophical poem 'On the Nature of Things.'

## The Disruptive Atom

Lucretius' fervid exposition of the theory that the universe may be analysed into two elements—atoms and space—in different relationships even as an explanation of life, the mind and the soul—makes his poem a great contribution to the philosophy of science as well as to classical literature. According to this view, all forms of matter are due to combinations of unalterable atoms in ceaseless motion; and the universe is a vast concourse of them under the control of fixed laws and independent in these respects of a providence or intelligent cause continually guiding their movements.

The theory remained a philosophic speculation for about eighteen centuries before attention to it was revived; and it was established as the foundation of modern chemistry by John Dalton early in the nineteenth century. Towards the end of that century, the discovery was made that the chemical element, uranium, continuously

emitted radiations which produced effects of both heat and light without measurable loss of mass. This led to the discovery of radium and other radio-active substances ; and scientific attention was concentrated on all their aspects, theoretical and applied.

At the beginning of the present century these studies led to the conclusion that the energy released by radio-active action was due to the spontaneous disintegration of their constituents. In the terminology of chemistry, atoms are still the smallest units which enter into combination ; and they make up the constitution of all substances, just as millions of different words are formed from letters of the alphabet. Chemical atoms are, however, now known to consist of systems of smaller particles in very rapid motion around a nucleus ; and their physical disruptions become manifest in the effects of radio-activity. The source of this energy was proved later to be in the nucleus of the atom and not in the lighter particles called electrons, revolving around it. Further experiments showed that the core itself could be divided and that the process was sometimes accompanied by an enormous output of energy.

These principles of nuclear fission had been established before the discovery was made, early in the year 1939, that when the nucleus of an atom of uranium had been split in two, additional atomic bullets were produced which carried on the disintegration process by themselves. A chain reaction could thus be created which broke up the uranium with great rapidity and at the same time released energy with immense violence.

All this experimental work was done purely in the pursuit of natural knowledge and was communicated freely to scientific societies and publications. The military significance of the fission chain reaction then came to be realised both in Europe and the United States, where, with the collaboration of American, Canadian and British scientists, a vast engineering plant was erected, and the frightful atom bomb was manufactured as an instrument of war. There were no secrets in the principles upon which its construction was based, but, as with other industrial applications of scientific discoveries, the conversion of laboratory experiments into engineering works on a vast scale meant that special methods had to be discovered and used in the process, and these alone constitute the secrets of atom bomb manufacture.

British and American scientists and technologists took three years to convert laboratory experiments into an engineering plant, that is, to bridge the gap between science and invention, and by so doing to make available an almost inexhaustible source of mechanical power. When atoms took form out of the void, this energy was locked up in their nuclear hearts ; and whatever may be the spiritual meaning or purpose of its creation, the discovery of it in the pursuit of knowledge is just as natural as that of any other force. When Prometheus of classical antiquity stole fire from heaven for use on the earth, he was condemned by Zeus to daily torture for this sacrilege. The celestial fire stored up by plant cells many millions of years ago and concentrated in sediments of the earth's crust is stolen daily in the form of coal and oil and used for the service of man.

The view that to acquire such knowledge of natural properties and forces is to partake of its divinely forbidden fruits is still held and has been forcibly expressed against scientists since atom bombs were exploded with such terrible effects over Hiroshima and Nagasaki. There can never be moral sanction for such mass destruction of human life, though history affords other examples of it in crusades and similar religious conflicts. It is an offence against the light, for whatever cause it is undertaken. The pursuit of natural or of supernatural truth is the noblest of man's endeavours. The use of the knowledge gained has enabled man to penetrate into the centres of stars but it can carry him also down into the pit to perish if his animal instincts continue to prevail over his moral understanding.

### Science and Invention

Science as the spirit of questioning is neither moral nor immoral ; and its justification is in the accumulation and co-ordination of knowledge. A scientific discovery is an addition to knowledge ; and an invention is an additional use of knowledge. On the principle that ' Necessity is the mother of invention,' the atom bomb was manufactured as a devastating weapon of war ; but it should not be assumed that scientists, any more than other groups of people, desire to be associated with the prostitution of knowledge in any form.

When man began to accumulate experience of the properties of natural things and to apply it for his own purposes he rose above all other living creatures and began to weave the fabric of civilisation. By his discoveries, he became possessed of knowledge which he is as free to use now as he always has been to distinguish between what is good for his existence and what are poisonous products of the world around him. From birth to death he has to defend himself against the many visible and invisible enemies which attack him wherever he is, or submit to be

destroyed by them. Man, like all forms of life, entered the world as a child beset with dangers, and under primitive conditions of life is still a victim of their aggressions.

Civilised man has, however, become a giant in his powers of meeting these attacks of natural things and forces and has learnt how to subdue and overcome some of them, though they still demand the sacrifice of millions of human lives annually. With this knowledge has come the creation of artificial devices of destruction as antagonistic to the development of the human race as the natural processes over which a certain measure of control has been acquired. While man has been learning how to control Nature he is still in the position of a child in his attitude and outlook towards the dangers which now encompass him and has not realised that his duty is to overcome them, as he has always had to do to survive the perils of the natural world in which he is placed.

This world has agents of destruction far more ingenious and effective than any contrivances devised by human inventors. Man has, however, not been content to submit to suffer disease and death from these natural enemies but has battled with them, and scientific knowledge has given him the power of conquest over many of them. The same spirit is required to meet and avert the dangers to civilisation created artificially, instead of pleading pathetically that they ought not to be put within his reach because he is still a child in wisdom.

At every stage of civilisation there have been conflicts between communities for one reason or another, and all available resources of men and materials have been used by the adversaries for their armed forces. This is as true of the weapons and machines used in warfare by primitive peoples as it is of those which have been placed at the disposal of the modern world by applications of scientific knowledge to invention.

War has always been an incentive to the use of devices to subjugate opposed armed forces ; and the weapons employed have reflected the position of the industrial arts. These have advanced with knowledge of the natural properties of things, from the time when prehistoric man found that he could make cutting and piercing implements from flints, and thus started a new industry, through the bow and arrow period to gunpowder and modern high explosives to the atom bomb. It is for leaders of nations to determine among themselves whether their hearts are strong enough to make the splitting of the hearts of atoms a means of improving conditions of life on the earth and the beginning of a new era or utterly to destroy what faiths and works have achieved in the history of civilisation.

Though the machine age is regarded to have begun in the eighteenth century, the foundations of it were laid ten centuries earlier through the general use of the Latin language and the institution of monasteries in which labour was combined with devotion to high ideals in the shaping of what has become Modern European or Western Civilisation. The distinctive feature of the present epoch is the harnessing of natural sources of energy to do work instead of using the physical powers of human beings and domestic animals to accomplish it. The inventions of the eighteenth and early nineteenth centuries came from the workshop rather than from the scientific laboratory, though revolutionary social and economic developments were brought about by them. Discoveries of science were used in those prosperous times with as much indifference to science as to humanity. There was then no moral indignation, such as is now often expressed, against mechanisms as degrading elements in civilisation and destructive of spiritual goodness.

It is natural to long for a more peaceful and less exacting condition of life than that which prevails in most modern cities and towns in this age of speed, hustle, and noise, but there is no historical evidence to prove that before the machine age labouring people in large communities were any happier than they are to-day. The primary needs of human life are food, clothing and shelter, and in the search of them man follows instinctively his animal instincts. He may be contented when these wants are supplied from natural or national resources without undue effort, but his condition is that of the beast in the field or a cave-dweller of prehistoric times. Civilisation begins when intelligence is used to increase these resources and to construct a cultural pattern, however primitive this may be.

Whenever natural sources of energy are made available for mechanical work by the use of wind or water power, or combustion of coal or oil, slave labourers of giant strength and untiring capacity enter the service of man and enable higher standards of living to be attained. It is not suggested for a moment that developments of this kind necessarily increase happiness or represent more than a single factor capable of contributing to progressive human welfare. As, however, man has a mind and the unique power of making useful or decorative things from the materials and forces in the world on which he is placed, it must be his duty to bring these gifts and talents into operation.

## Languages of Expression

When mankind emerged from its sub-human ancestry, its inherited instincts began to have their impulses determined by a reasoning faculty and it became possible to acquire and accumulate knowledge to be handed down from one generation to another. In this respect, therefore, the human race can be said to mark a distinct stage in the evolution of life, and its advances in any direction to represent progress.

All such advances originate in new concepts or ideas which may or may not take material shape. Every new idea is, however, a stimulus to further intellectual expansion or practical endeavour, and civilisation is the record of their development. Measured by the means of increasing the material welfare of mankind, science and invention may claim always to have led the way. The laws and principles they discover and apply are additions to knowledge by which conditions of life can be improved in this world during the short period of occupation by the human race. What is our destiny here we do not know, but while we are alive it is our obvious duty to do everything in our power to raise the standards of living and find out at the same time the relation of our small planet to the many millions of other bodies in the universe.

The moral law is apprehended by a different set of experiences from that of natural science. Recognition of its influence as well as of the utility of knowledge determine together the progress of civilisation. In each case the aim must be the attainment of the highest good on this earth whatever the ultimate destiny of the human race may be. Goodness, truth and beauty are abstract ideas appealing in diverse ways and tones according to attitudes of mind, but appreciation of their qualities is not excluded from the field of natural science any more than it is from other factors which constitute human progress.

Intellectual expansion and the forms in which it is expressed are distinctive attributes of human nature and elements of progressive development. When the Sumerians became urbanised nearly five thousand years ago, they found it necessary to introduce seals and clay sealings as guarantees of authenticity of commercial contracts and legal obligations. With these seals they developed a system of pictographic writing on clay tablets, which evolved into the cuneiform script. As the temple was the centre of the Sumerian civic organisation it was also, through the development of writing, the cultural centre where knowledge was accumulated and used. The inscribed seal had a most important effect on the development of art, while the necessity for a dignified and fitting home for the god led to advance in style in building worthy of the name of architecture, to which the use of mud-brick could have contributed in no other way.

Drawings provide a universal means of representing objects, and their characters also convey individual or composite emotions and meanings. Many early forms of writing are conventional characters developed from pictographs of this kind ; and out of these conventionalised marks alphabets were constructed or characters were combined to represent syllables. All human beings express certain emotions, such as anger and fear, by much the same sounds, signs and gestures, and all can interpret simple picture writing, as all can understand the meanings of actions reproduced in modern moving pictures, silent or sound. There are, however, many conventionalised forms of characters to represent these sounds and thoughts by written or printed words, and these combinations make up the many languages of the world.

Pictographs or ideographs thus evolve into symbols representing gestures and sounds and then to alphabets, the letters of which are combined in words to convey ideas from one place or time on the earth to another, however far or long they may be separated. Sounds were combined to express emotional feelings in the earliest civilised times, but the history of the art of music cannot be traced like that of literature because no musical compositions from those times have had their forms or contents preserved.

While, therefore, the contribution of a people or a period to the expansion of the human mind can be found in its literary records, and comparisons made between them on a scale of refinement, there is no clear relationship between early and modern practices of the musical art. The melodies of primitive peoples to-day do, however, afford an indication of rudimentary combinations of sounds and this folk-music has its own standards of excellence. Progress in music as in art, like that of literature, is in the exalted combination of the notes of a chromatic scale into a composition which arouses in its readers or listeners the emotional feelings which their writer wishes to convey. Fertility of creative ideas and the forms to which these give shape are the measures by which progress in all these arts of expression may be judged.

Increase of opportunities to read and hear what is thought or said in words or music is of even greater importance in the history of civilisation than the works themselves. This began with the production of books in

which raised letters or other characters were impressed with ink or other pigments upon the pages. Much of the early printing was done with page-blocks of this kind ; and the same plan is adopted in printing from stereotyped plates of pages to-day. The use of movable type was first introduced by a Chinese alchemist and inventor, Pi Shêng, in the eleventh century. He used type made of baked clay and experimented also with wooden type. A later improvement made in China was to use tin for the movable type. Early in the fourteenth century movable types were made in Europe of wood, tin and lead, but the modern art of typography may be said to have begun when in 1454 Johann Gutenberg issued from his printing press at Mainz, books printed from types cast in a mould.

From a cultural point of view the value of the invention was in the extension of opportunities of acquiring knowledge through book-learning. There were literary works and libraries in Assyria, Babylonia, Egypt and China in very early times, but each had to be separately written by hand. A book is a collection of scripts joined together to form an organic whole so as to be portable. The first books may thus be said to be those written on papyrus in ancient Egypt. Several rolls of this kind, with columns of hieratic writing done about 2500 B.C., have been found in tombs and are preserved in national museums. They are samples of many early Egyptian writings of a didactic and moral character, apart from religious spells and praises of the divine. Most of this secular and sacred literature, preserved on rolls of papyri, was made for school use by young scholar-scribes. There were wonder-tales, romances, humorous and gruesome stories, moral admonitions, types of worldly wisdom and rules of devotional conduct towards divine influences in the East five thousand years ago as characteristic of human life and its spirit as the literature of classical and modern times.

The invention of mechanical printing, and the use of paper instead of papyrus, made it possible to produce the many millions of books now in libraries and for the knowledge and wisdom of all peoples to be distributed throughout the civilised world. It is in the extension of this intellectual influence and the continuous development of processes of reproduction that the art of printing has reached the high position as a cultural force which it occupies to-day.

In so far as art, literature and music are expressions of the human spirit as well as reactions to conditions of life, any agency which multiplies their points of contact may justly be said to aid the progress of the race by expanding the outlook. This is what was done when printing presses converted the small corps of transcribers into a great mechanised force in the front line of civilisation. The advance was in apparatus of manifolding literary compositions and thus to give wider range to the light of the torch of learning.

## World Services

The value of devices for reproducing words and sounds, written or spoken, lies, therefore, in the increased contacts between human minds and the measure of truth attained in the reproduction. This has reached a high degree of perfection through the combination of mathematical theory and physical experiment ; with the result that broadcasting truly brought about a condition when 'Their sounds went out into all the earth, and their words unto the ends of the world.' These developments began with the invention of means of producing and detecting electro-magnetic waves other than those in beams of light and transmitted with the same velocity of 186,000 miles a second. What has since been achieved so impressively is due to the use of increased power to create such waves and increased sensitiveness of instruments to detect and reproduce their qualities. This has been made possible through the increase of knowledge of the atomic structure of matter in relation to the energy of electric waves. The electrons contained in the atoms of all forms of matter were found to be identically the same, and when these are torn off by thermal or electrical influence they constitute a stream of invisible particles which travel with the speed of about one-tenth of the velocity of light.

The basis of all systems of radio transmission of sounds or scenes is the production of electrons and the detection of their effects. In a radiolocation equipment, the particles create pulses of waves which are reflected by objects in their path, as sound-waves are reflected in echoes. Though the interval of time between the dispatch of the waves and their reception is extremely short, it is clearly shown on the time-scale of the apparatus used and becomes a scale of distance. As radio-waves are reflected by obstacles of any kind, they can be used in darkness as well as daylight, in thick fog or other obscuring atmospheric conditions, as light to show whether the way is open or not. Radiolocation, or Radar as it is now termed, has thus given civilised peoples new powers of electric vision which are already being used to ensure safety of movement on the sea as in the air, in addition to the detection of small or distant enemy aeroplanes and submarines, for which purposes the instruments

used were designed and applied with conspicuous success.

All mechanical aids of this kind, whether phonographic or photographic, are often referred to contemptuously as scientific gadgets which are, on the whole, detrimental to progressive spiritual development. It is suggested that because they are created by man's own efforts, without appeal to supernatural influences for guidance or reference to religious faith, pride in them is to be deplored rather than encouraged. By the same token, the natural machine power of modern times is regarded as a failure, and a return to supernaturalism is urged as the only means of shaping a new and better world.

To assume such an attitude towards civilisation is irrational and puts two different standards of value in conflict instead of regarding them as complementary to one another. It surely must be the duty of man to learn as much as he can of the material universe, and of the earth upon which he has to live : and it cannot be wrong for him to discover and apply knowledge of natural properties and forces, whether these are understood as having been created for his service or not. To condemn such knowledge as having a numbing effect upon aspirations of the human soul, and the machine age as a degrading period in the upward growth of mankind, cannot be justified either historically or rationally. What is wanted to-day more than at any other epoch of civilisation, because of the powers which have been placed at the disposal of civilised peoples, is the strengthening of the human heart everywhere to act upon the principle of brotherly kindness contained in the maxim common to all religions and ethical systems : do not unto others what you would not they should do unto you.

## Civilisation and Ethics

Civilisation is essentially distinguished from barbarism, and man from other living creatures, by the effects of high spiritual ideals upon human conduct. Many of these ideals are common to all peoples, and the values attached to them determine both individual and social endeavour. The standard of attainment reached by a human society towards all elements of ' goodness ' is a measure of the place of the society in a civilising process. The pursuit of natural knowledge may claim to be one of these ennobling elements, as it leads not only to means of improving conditions of life but also to a broadening of man's intellectual and social horizons. Devotion to these objects, courage of enterprise, faithfulness to truth and humility of understanding represent the spirit of science as truly as they are combined in other fields of thought and action. The relation to moral goodness of the results achieved depends mainly upon the attitude taken towards natural knowledge and supernatural revelation.

As ethics is the science of morals in their widest sense it is concerned with the influence of each of these attributes upon the character of the individual and the structure of society. What man is in himself, and what are standards of moral righteousness have varied greatly with cultural conditions in the history of civilisation. A system of ethics, or rules of conduct, by observance of which conduct in life is brought into harmony with cosmic principles, is a part of all religions and is associated with many conceptions of deities and conventional forms of worship. In all ethical systems, as in all high religions, certain elements of human goodness or virtue are esteemed, and attachment to them is a measure of righteousness of life.

Socrates taught that in itself right ' knowledge is virtue ' ; but it was Aristotle, the greatest of the Greek naturalists, who held that happiness or goodness, which in the individual means ' well-being ' and to the community ' well-doing,' should be the aim of an ethical system. His knowledge of natural history was copious and comprehensive, and he used it to co-ordinate what was thought or known about living things into a science, while at the same time he showed that appreciation of truth and beauty in Nature does not impair promotion of the quality of goodness of a way of life. The ethics of human conduct taught by Confucius two centuries earlier constituted a similar code of practical morality in a civilisation which takes a high place in the history of man and his works.

The highest type of social organisation is that in which both material good and ethical goodness are rightly balanced. As material progress must in its nature be more striking, more patent to observation, than progress in man's ethical and social development, there must always be a lag in time between the operations of the two forces. The idea that the scientific and inventive mind is necessarily antagonistic to the merciful heart is as degrading to knowledge as it is untrue of the virtue of goodness. The gap between application of the two qualities is due to the selfish sides of human nature, and not to the increased power and supplies which knowledge provides for the primary needs of life.

It is permissible to suggest how this knowledge could be used in the construction of

a new world, whether for better or worse, but no one believes that improvements of material conditions can be made a measure of ethical goodness. This, however, is what is asserted to be the position occupied by science in visions of the development of the human race in the past, present or future. It is the basis of a charge that advances in natural knowledge are inimical to the growth of the noblest attributes of the spirit of man. We have had, therefore, literary pictures of machinery being developed to such a dangerous stage that it had to be abolished, and on the biological side to conceptions of a world of planned types of inhabitants, each, like social communities of insects, with intellectually deadening functions to perform.

Literary works of this kind are parodies or satires of potentialities of applications of knowledge, and in no way represent a scientific view of the factors which have enabled man to survive and reach his present position. It is true that, by the release of atomic energy, modern civilisation has been provided with the means of destroying itself, but the same power is available for making the earth a celestial dwelling place, just according to the service to which it is put. There is now, as always, freedom of choice between good and evil fruits of knowledge ; and the ways in which these are cultivated or controlled will be the reply to the menace now facing civilised peoples. All who have goodness in their hearts and goodwill towards their fellows should unite in meeting this challenge to movement onwards and upward.

## Progressive Humanism

Faith in this spirit, in whatever way it is promoted or manifested in the works of man, is often regarded as presumptuous pride in his creative and constructive capacities and therefore irreligious in the sacred meaning of the word. The spirit is, however, associated with all aspects of intellectual and material progress which have influenced the course of civilisation. Devotion to it is the religion of secular or scientific humanism, because its principles do not include knowledge of the supernatural and relate only to the practical application to life of the favourite Christian maxim of the British monk, Pelagius, ' If I ought, I can.'

Humanism in this sense is the integration of all influences which promote the development of the human race, whether or no it includes the teaching of a particular religion. Principles or practices which raise man out of his animal ancestry and add to his status among living creatures can rightly be termed humanistic. Their spirit is displayed in works of science as well as in art and literature ; and the measure of their value is that of the opportunities these afford for improving human welfare on the highest standards that the mind can conceive and the heart will sanction.

Whatever convictions are held about the meaning and purpose of man's existence, he finds himself on a globe from which he has to obtain needs of life, and also with a mind which can appreciate such abstract qualities as beauty and love, goodness, justice and mercy, whether seen on the earth or projected on the heavens. Modern humanism takes account of all these factors of cultural development, secular or sacred. It understands very clearly that the earth is but a temporary home not only for the short span of individual life but also for the whole human race. As tenants or trustees our duty is to make the best use of the resources of our heritage by the exercise of all our talents and with the belief and hope that by so doing we are contributing to make men godlike if not godly in the sense of religious faith. So may the earth become part of the heavens of the universe in spirit, as it is already in truth.

# THE DISSEMINATION OF SCIENTIFIC INFORMATION TO THE PUBLIC

REPORT OF A CONFERENCE HELD BY THE BRITISH ASSOCIATION IN COLLABORATION WITH THE ROYAL SOCIETY, JULY 8, 1946

DURING the preparation of a programme for the Empire Scientific Conference organised by the Royal Society, it was suggested that improvement in existing arrangements for disseminating scientific information to the public was a question worthy of consideration. It was decided, however, that the topic was of such general interest that it ought to be discussed in a wider forum, and the Royal Society and the British Association collaborated in arranging a public conference in which Empire scientists took part. The conference was held in the Royal Institution by kind permission of the Managers. It was opened by Sir Richard Gregory, Bt., F.R.S., President of the Association, who presided at two sessions, one in the afternoon and one in the evening, with a short interval for tea.

**Sir Richard Gregory, Bt., F.R.S.**

IN opening this Conference on 'The Dissemination of Scientific Information to the Public,' a few words explaining its source and scope seem to me to be worth saying. It will be remembered that the Royal Society Empire Scientific Conference was opened by the King at the Senate House of the University of London on June 17. The Conference was organised by the Royal Society at the invitation of H.M. Government, with the main purpose of stimulating the interchange of scientific information and encouraging the co-operative spirit in scientific research within the Empire. Arrangements were made for the preparation of papers and reports on the present position of these contacts and on measures for the possible extension of them. In addition, a number of topics of a more specialised kind came into the programme of the Conference and arrangements were made for the preparation and discussion of communications in assemblies of the delegates.

Among the subjects which the Policy Committee of the Royal Society decided to include in the programme was that of the public presentation and reception of scientific information. A Working Party was constituted by the Society to deal with this subject in a paper for the Conference. It was decided later that, as measures for dissemination of scientific information to the public involve the interests of both consumers and producers, their discussion should be open and not confined to a meeting of delegates. The Working Party itself was of this character, and included representatives of broadcasting, films, the newspaper Press and book publication, museums, exhibitions, and other agencies available to make the quality of supplies of cultural information twice-bless'd, in spirit and in truth.

The report presented to this assembly for consideration and discussion thus contains contributions which may be regarded as summaries of evidence from a number of points of view on the needs and nature of the dissemination of scientific information to and for the general public. It is particularly fitting that the meeting should be held in this historic Lecture Hall.

The Institution was founded by a group of scientists and philanthropists nearly one hundred and fifty years ago, with the object of diffusing scientific knowledge and facilitating the application of science to the common purposes of life. Since the days of Sir Humphry Davy, it has been a centre for researches of the highest order and for the regular exposition of new scientific developments to a much wider range of intelligent interests than those of scientific specialists. No closer contact between scientific investigators and the presentation of their discoveries in ways and words readily understood could be desired than that represented by the eminent men of science who have worked and lectured in this Institution since its foundation.

The British Association has similarly exercised the function of bringing the position of scientific knowledge before the general public through its annual meetings, to which the periodical press has long given close attention. These meetings are usually held at provincial centres, and have included meetings in Canada, South Africa and Australia. Some years ago, also, the Association sent an important delegation to the jubilee meeting of the Indian Science Con-

gress Association. Our Association has therefore been able to foster interest in all aspects of science over a very wide field. It has done for the provinces what the Royal Institution has accomplished with supreme success for audiences in London.

After considering the valuable communications made to the Working Party by its members and others interested in the diffusion of scientific knowledge, the conclusion was reached that an Institute should be established, partly from public and partly from independent sources, as a channel of contact between agencies responsible for the dissemination of scientific information and the original sources of scientific knowledge. It may well be, to use the last sentence of the report, ' that no better parent organisation for the Institute could be suggested than the British Association for the Advancement of Science, whose work in this field has been famous for more than a century.'

**Sir Henry Dale, O.M., G.B.E., F.R.S.**

WE are meeting today in an Institution which was opened in 1799, not far short of 150 years ago. To quote the words of its prospectus it was to be an Institution ' for diffusing the knowledge and facilitating the introduction of useful mechanical inventions and improvements, and for teaching, by courses of philosophical lectures and experiments, the applications of science to the common purposes of life.'

Through the perhaps rather pompous phraseology of this definition, I think that one can detect the interest of the founders in those social relations of science which some of our contemporaries seem to regard as almost a new revelation, as well as in that dissemination of scientific information to a wider public which is the subject of our discussion today. These objects were prominent, more particularly among the interests of the remarkable man who took the initiative in the foundation of this Royal Institution—Benjamin Thompson, born as a British colonist in North America, a soldier, a civil servant and a diplomatist, as well as a distinguished scientific discoverer and inventor ; who, for his services to the Elector of Bavaria, was ennobled as a Count of the Holy Roman Empire, and took his title from the New Hampshire township of Rumford. When Count Rumford quarrelled with his fellow managers here and returned to the continent, the experimental kitchens and model workshops that had been an important feature of his plan were abandoned ; but the Institution retained the alternate function of expounding the developments of science by lectures and demonstrations to an audience of which the majority were people of no scientific training. In this direction it achieved, during the nineteenth century and even later, an influence and a reputation beyond any which its founders could have foreseen.

This scientific information reached, of course, a constituency very much narrower than that which we have in view in today's discussion. The founders intended it for the nobility and gentry, by whose subscriptions the Institution was to be established and maintained. Even today we could hardly claim that the members of the Institution who, with their friends, attend the special Friday discourses started in 1825, and the advanced students for whose interest and instruction courses of lectures on other days are additionally provided, represent more than a small section of the great public, with whose needs for reasonable scientific enlightenment our discussion today is mainly concerned.

Experimental demonstration has been a special feature of the Royal Institution lectures, and this, in the nature of the case, has been a matter for a limited and select audience and not for a wide public ; but the development of the technique of the film and of television, which we may now expect to be rapid, may well be found to have made a radical change in that respect. I cannot, of course, anticipate decisions of policy that present and future officers and managers of the Royal Institution may make, with regard to its own concern with such developments. I do suggest, however, that the Institution where we meet has been a pioneer in the general dissemination of scientific information by lectures illustrated with actual demonstrations ; and that traditions here so long established and kept going to this day without actual interruption, even by enemy attacks on London, ought somehow to be made effective in the development of the combined auditory and visual presentation of scientific discoveries to a wider public, which the near future should see.

It was not without significance, I think, that scientific lectures by Davy, Faraday and Tyndall should have attracted even fashionable London here in such crowds as to fill Albemarle Street with their carriages ; so that instructions had to be given to the coachmen to set down with their horses' heads towards Grafton Street. And for a demonstration lecture by Dewar an audience assembled here of notabilities such as you can see in the anteroom, portrayed in the picture of Dewar giving one of the Friday evening lectures. The late Sir William Bragg carried on till a few years ago the full tradition of these great predecessors, including the Christmas lectures, to which the children flocked to learn from him and from other scientific leaders, as they had once crowded this theatre

to hear Faraday, who started the series. These opportunities, however, for all their value, have been restricted not merely to a privileged minority, but to dwellers in or near London.

The British Association for the Advancement of Science, on the other hand, from its foundation in 1831, adopted the policy of carrying science to the country at large, and eventually to the whole British Commonwealth of Nations, by holding its annual meetings at centres other than London, in the United Kingdom, and from time to time in one or another of the British Dominions overseas. More than one of its early Presidents compared this aspect of the Association's policy to that conceived by Francis Bacon in 'The New Atlantis,' when he described the sending forth from his 'Solomon's House' of students of science as 'Merchants of Light to make circuits or visits of divers principal cities of the Kingdom.'

In its early days there seems to have been some division of opinion as to the function of the Association in relation to the wider public —fears by some that science might be misled into descending from its lone pinnacle and cheapening its appeal; criticism of the Association by others on the assumption that it was intended thus to be an agency of such vulgarisation of the mysteries. There can be no doubt that the founders of the Association did intend not only to create wider and more organised opportunities for the meeting of scientific men to discuss their problems among themselves, and to provide for a more systematic attack on some of these problems; but also, and especially, to strengthen the appeal of science to the community as a whole, and to bring its importance and its potentialities more effectively to the notice of those responsible for government.

This more public appeal has, in any case, come to be a recognised feature of the British Association's proceedings. It seems to me, therefore, that there is reason for considering carefully the suggestion which has been put forward by the Working Party as to whether the British Association, with its long experience as an interpreter of science to a wider public, would not be the most appropriate body to hold a special responsibility, in connection with the new mechanism for the organised provision of authentic news about scientific discoveries and developments for the general public. I think that we shall all agree that the interpretation of scientific progress to select and cultured audiences is now not enough. 'The application of science to the common purposes of life' is no longer an aspiration for philanthropists of the type of Count Rumford. The material basis of all civilised life grows every day more scientific in its very texture, and it is becoming an interest and a right of everybody to be given as clear, as balanced, and as technically authentic an understanding of what is going on as we can contrive to give them.

There have indeed been efforts to meet that need in periodical publications. *Nature* is well known to us all, and extends its appeal to a constituency, I should imagine, roughly coincident with that of such an audience as follows the British Association. *Discovery*, an admirable survey, in my judgment, for those who have already some background of scientific education, is still hardly wide enough in its aim or its appeal to cover the range of our present discussion; while the British Council's *Monthly Science News*, restricted in dimensions and above all in circulation by paper restrictions, has hardly been seen in this country at all.

As evidence of a larger public ready to be interested in scientific discoveries, and in their contribution to the shaping of modern life, we may note the success of films such as those about Louis Pasteur, Paul Ehrlich, and Marie Curé; and we may perhaps be permitted to wonder when English-speaking film promoters will show a similar enterprise with regard to the lives and achievements of scientists not less distinguished and interesting, one would suppose, than any of these, who happen to have spoken our own language: Isaac Newton, Benjamin Franklin, Michael Faraday, or Ernest Rutherford.

I have no doubt myself that there is a real need now in this country, and for the British Empire as a whole, of some central fount of independent and authentic information to which the journalist, the radio broadcasting organiser, and the film promoter—those whose business and duty it is to inform and to interest the great public, to awaken it to the significance of science, and to appease the hunger thus created with a palatable and wholesome digest—may appeal with confidence for guidance and instruction. It hardly needs to be stated that scientific discoverers as a class are not always, or even usually, the best and clearest interpreters of their own achievements for such purposes. Even if they were, the publicist would often need some expert guidance as to who in a particular case could properly be regarded as the discoverer. The journalist and the radio organiser ought to have some source of information which he can regard as independent, if not infallible, as to the truth concerning some scientific event, and as to the person whom he can properly approach to write or to broadcast about it. He ought to be able to do this without fear of encountering a fanatic, a man with an axe to grind or a grievance to air, one who will try to use

science as a sugar-coating for some pill of political propaganda, a poseur, a pedant, or a bore, but with confidence, on the contrary, that he is dealing with one who can be trusted to give a sound and straightforward account of the matter, simple and vivid in style, and of a quality to appeal to the general imagination.

The man of science, for his part, ought to be protected from the journalist out for scoops or hot news, and from being followed round the world like any film-star, by press agents anxious to entrap him into an indiscretion, or to get hints from overhearing casual conversations which can be distorted into sensational claims for new discoveries, and make him ridiculous in the eyes of anybody who knows and respects the truth. I do not think that anyone here will seek to deny that such things have happened, or to claim that they are worthy of the dignity either of science or of a journalism properly concerned with it.

On all accounts, then, let us have a proper British and Imperial organisation for assembling and distributing such factual and authentic information about the realities of science, as is needed for a scrupulous but vivid presentation to the people who ought to be told about them. And I suggest that the experience of the British Association might well be used for the creation and the control of such organisation.

### Mr. Ritchie Calder, C.B.E.

I WANT to make two assumptions: first, that you have all read, or will presently read, the carefully prepared paper produced by the Working Party, and that all of us here at least believe that the public should be educated or inveigled into a proper appreciation of science. That is, we are all here as evangelists; and having said that I propose to come down from high purpose to crude self-interest. It is our high purpose to see the man in the street is enlightened about science for his own good and for the good of the world in general. It is the scientists' self-interest nowadays to see that the man in the street is enlightened about science for his —the scientist's—own good.

During a session of the Empire Scientific Conference at Cambridge, Professor Cockroft introduced us to a new American unit of measurement, the mega-buck, meaning a million dollars. I suppose the sterling equivalent would be 'mega-quid.' Well, for the last few weeks the Empire delegates have been discussing problems and projects of most vital importance to science and to the Empire, and to the world in general. It has been discussing them in terms of 'mega-quids'; and most of their plans and most of their worthwhile intentions need money, big money, sums far beyond the independent resources of science or private endowment. It means very largely that government money is necessary, however it is allocated; whether for direct government projects in the shape of State research, or whether through special grants-in-aid to special workers, or whether it is through grants without 'strings' to learned societies. I agree that to maintain pure research, as the government has defined its policy, it must be well furnished with money; but that it should be completely untrammelled; but however scientists and governments arrange that sort of thing, it is still taxpayers' money, and it is still derived from the general public; and I seem to remember we once had a civil war in this country, and a king lost his head, because the people, properly, insisted they must have a say in how he spent the taxes levied on them; and I seem to recollect that because certain colonists insisted on 'no taxation without representation,' Britain lost America and the atom-bomb.

In a democracy the people have a right to know how their money is being spent; or, putting it in another way, the scientists will not go on getting money to spend if the public do not have a proper understanding of science and a sympathy with its objectives. Above all they certainly will not, I suggest, sign blank cheques for the untrammelled research that we all want, unless they consistently understand what pure science means, and trust the men who do it.

It is essentially true that, if you are going to have a really healthy endowment of research and the development of research on the scale of expenditure which science must insist upon nowadays, you must carry the public with you. Newspaper men believe in the Fourth Estate, and believe the electors all read newspapers. They do not always vote as we tell them to do, but we have access to those who pay the taxes. Therefore the press is one of the most important channels for informing the public about science.

It would be very unfair to reproach the scientist for failing to inform the public about science. It has been frequently true, in the past at least, that the Press have been more than remiss in this respect, and I go all the way with Sir Henry Dale in his demand that the handling of science in the Press, and the handling of scientists by pressmen, should be rather different from what it has been in the past. But there are signs of grace in the newspapers today. There is unquestionably an increasing interest in newspapers in science and a reasonably rational interest as distinct from the urge for sensations, queer headlines and so on. It is most important to see

that, while the scientists are trying to put their house in order, the newspapers should also do the same, and understand what they are trying to do, and what their objects are in the presentation of science. That is a very great problem, because it is essentially true that the first purpose of a newspaper is to provide news, and science has to be judged in the first place by standards of news. It is quite incidental that a newspaper may consider its function to be educative.

Newspapers are geared to news, and to a very large extent that news is gathered by general reporters, who do not essentially know very much about science, and frankly should not be expected to know very much about science. I regard the general reporter —a well-trained general reporter—as the best-educated man in the world, because he has to have so many interests, and because he is alive to so many things, though that does not mean that he is an expert in all things. One of the delegates at a science conference complained the other day that a reporter talked to him on his subject and knew absolutely nothing about it. Before he could make himself intelligible he had to start with the elementary abc of the subject. He was a physiologist, and I could take him to talk to a geologist who would equally have to have an elementary outline. The relation between the scientist and the journalist must be one of reciprocal understanding and a good deal of patience.

The ideal science writer for the newspapers has not yet been discovered. That is because it is a very difficult problem to blend in the same person scientific expertise with a trained and experienced journalism. I am a trained journalist without any claims to scientific knowledge at all, except what has been gathered during sixteen years of intensive interest in science, against the background of a long experience of reporting crime and various other things. Whether you can approach it best from that direction, or whether you can in fact take science graduates and turn them (I suggest by a pretty hard training) into journalists, I really do not know.

In any event it is a question of manpower. Are we going from Fleet Street to make heavy demands on the extremely limited resources of scientific manpower, about which we have heard so much at the Empire Scientific Conference in the last three weeks? These problems cannot wait, and we have to rationalise our relationships between newspapers and science, and to think of the rationalisation of the machinery by which we expend our energies; and I for one endorse very wholeheartedly the suggestion that the British Association should undertake the kind of project which has been suggested. After all, the British Association has for 115 years been trying to do, expansively, what we are now trying to do intensively. The difference is in emphasis and in speed. One hundred years ago science was advancing sufficiently slowly, and the public were enjoying sufficient leisure to make an annual conference of the British Association sufficient to supply the interests and the needs of the public about science. Today it is from day to day and from hour to hour, and as a responsible Science Editor, I assure you that the amount of material which now pours into a newspaper office, masquerading as science or scientific news, is quite appalling, and rather like the flood of actual research material about which the Empire Conference had had so much to say. I throw away at least ninety per cent. of the science items, not always because it is not sound or not accurate, but because today, with science advancing so quickly and so rapidly, the old general lack of understanding of science by the public is now increased, and you cannot just fling an item at them. You have to give the background, and there is no space today in the newspapers to provide that background. When the newspapers are enlarged, a great deal more space will be devoted by the Press to scientific news and information, and a great deal more responsibility will be shown by them. It is towards that day that we ought to be preparing now the relationship which we want to see established—the confidence and above all the right of access.

If the scientist is to be protected from being pestered by a journalist, authorised channels of access and introductions must be provided. It is therefore important that the proposed Institute of Scientific Information, which for the time being I should more modestly call the Bureau of Scientific Information under the British Association, should provide checks and rights of access. I do not suggest for a moment it should provide a science service such as they have in America. We have not the resources to attempt that, and in any case, any such service would have to develop. But we ought to have a system by which newspapers, films, radio and so on can turn with a right to know who are the right people to be approached, what is the sort of immediate check necessary on a story, where is the material available for articles, etc.

I believe that that job could and should be done by the British Association. If I may say so, I believe in putting the howdah on the elephant. It is a very venerable elephant, and it has carried a heavy weight for over one hundred years; and I believe that the British Association can do it, given adequate resources, staff and equipment. I believe

that the provision of this Bureau of Scientific Information, which is very desperately needed, lies properly with the British Association.

### Commander Ian Cox

MUCH that Mr. Ritchie Calder has said about the relation between science and the public as affects the Press, applies also in the case of broadcasting, and I need not enlarge on the public's demand for scientific information nor its right to get it. Since radio is such a new medium, however, it seemed to me that it might be interesting if I reviewed the process through which one has to go in putting scientific material on the air.

I think for the moment we might confine ourselves to three main channels through which scientific information can be put on the air. The first is News, which is a statement prepared for reception by the ear, as opposed to the eye for which Mr. Calder caters, and in the delivering of which the personality of the reader has no material relationship at all with the subject-matter. He is in fact the News Reader. The news item is normally confined to a statement of fact ; and the function of the news bulletin is to report anything of reasonable public interest.

The next category in which one can include scientific material is Talks. This is verbal radio communication, intended for reception by the ear and in which the speaker has a direct relationship with the subject matter. The Talk may be intended for information, or comment, or instruction, or entertainment. Normally we find the best results are obtained in Talks if a script is used when the Talk is given.

The third category is Features. A Feature Programme is one concerned with a principal theme selected principally on account of its dramatic possibilities.

So far as news is concerned, there is nothing very much that concerns us at the moment with regard to the transmission ; but relevant to the subject is this, that those officials responsible for including science news items in the bulletins must have an adequate supply of factual news material. There is another consideration, that of speed. Further, we must get the material quickly and its authenticity must be vouched for.

One main advantage of the radio talk is that it enables a very large number of people to hear in person whoever is selected to speak. If a discovery of public interest, for example, is made, it is naturally required that the greatest number of people should be able to hear the man who has made it, and I suggest that radio provides the highest form of authenticity available at the moment, in being able to bring this about.

Turning for a minute to the requirements in broadcast speakers, one finds it is generally assumed that for someone to be acceptable as a radio speaker, he should have most of the characteristics normally attributed to an announcer. I do not know why this is so generally believed, but it is certainly not the case. The requirements so far as concerns voice in a radio talk where the material is of interest are not very exacting, and it is quite right they should not be. The personality of the speaker *must* be allowed to come over the air if this is humanly possible ; if it is not, much potential authenticity will be lost.

There are very few ' impossible ' broadcasters, and very few first-class broadcasters ; but usually a potential speaker is generally acceptable provided he is advised correctly by the producer.

The problems of radio communication have made it necessary for a new ' trade ' to come into being—that of the radio Producer. In the case of talks he is the specialist who advises speakers as to the most desirable form for the presentation of their material, both from the point of view of their own vocal capabilities and from the point of view of the listener who has to rely on his ears alone and cannot ' re-read.' The Producer is also responsible for recommending, assembling and collecting material for inclusion in the programmes.

So far as suitable radio material is concerned, the quickest way to examine its requirements is, I think, by considering the ways in which it is possible to bore by radio—in other words, by deciding what classes of material should not be accepted. There are three main ways of boring : the first is to broadcast subject-matter of no interest except to a very small proportion of the audience. The second is to present a subject or theme in a way that renders it unintelligible to most of the audience. The third way is to transmit monotonous or boring sounds ; quite a number of human voices fall into this category.

The ways of dealing with these pitfalls are fairly simple. First, as to broadcasting subject-matter that is of no interest except to a very small proportion of your audience. The policy must be to decide that certain matter should not be included in programmes so long as the number of frequencies and the number of hours available for broadcasting are limited. The second way of boring is to present a theme in an unintelligible way. It is very much the business of this new profession of radio Producer to ensure that does not happen.

Contributing to the third way of boring,

the transmission of monotonous or unpleasant sounds, I am afraid you have a few of the impossible broadcasters. In these cases it appears that the public would rather not have a completely authentic presentation, but would rather hear the material from another mouth. In less extreme cases, we can allow the boring voice to be there, and 'dilute' him, or rest the audience, by using an interlocutor or a compère.

I think I have said enough now for it to be clear that the radio Producer—it does not matter how well qualified he is as a scientist when he joins the radio organisation—has so much technical business to carry out that he will very soon cease to be completely and currently informed of developments in his own or kindred subjects. Even men of science themselves performing in the A Sciences now would not claim to be fully acquainted with what is going on in, say, some of the B Sciences, so it cannot be expected that a Producer, doing his job as a Producer, should be *au fait* with all that is happening in the scientific world. It therefore becomes as necessary to broadcasting organisations, as it is to the Press, that such a Bureau as has been suggested should come into being as soon as possible. It is, in fact, the only way apparent at the moment whereby the necessary scientific news and information can be provided authentically and with sufficient speed and understanding.

For a long time before the war I had the closest and happiest associations with the British Association and I could not think of suggesting anything more suitable than that the Association, if it can, should undertake this work.

### Mr. Paul Rotha

THE atmosphere which surrounds the business of film-making and film-going thrives to such an extent on global statistics that the real significance of the statistics of the motion-picture industry is often underestimated. When we read that every week throughout the year over twenty-five million admission tickets are paid for at the box-offices of nearly four and three-quarter thousand cinemas in the United Kingdom, I wonder if all of us grasp just what this means in terms of influence on public behaviour, and in the conveyance of facts and ideas to a great proportion of the population. The cinema has so quickly become an accepted part of our social life that we are apt to be more lenient to the irresponsibility of its owners than we are in our attitude towards the Press.

In using this powerful medium, with its twin appeals of sight and sound, for the dissemination of knowledge and ideas for scientific ends, some advance has already been made in what has come to be known as the 'non-theatrical' field of production and exhibition. During the war and subsequently, the British Government, through its Ministry of Information and British Council departments, has encouraged this specialised making and distribution of informational and documentary films to be shown to organised audiences. Some excellent films have been commissioned by the Ministry of Information on various aspects of medicine and surgery, veterinary science, aeronautics and electronics, agricultural methods and pestology. During the war, the three Services used the film medium extensively for training and instructional purposes, and several Government Departments realised its value in conjunction with record and research.

Today, the newly-formed Central Office of Information is continuing this policy, for and on behalf of the Government Departments, and not a few of the films thus made and distributed deal seriously and intelligently with branches of scientific work. The activity of the National Film Board of Canada is another fine example of this use of the film for information and we welcome the news that Australia too now has its Film Board.

We should remark carefully, however, that all these films have had to rely on Government sponsorship for their production and exhibition, and that without that subsidy there would be very few good scientific films available today. It is not always appreciated that the revenue to be derived from the exhibition of scientific films is hardly ever commensurate with their cost of production. Almost the whole achievement of the British documentary cinema has been made possible only by Government or industrial sponsorship and not by private investment.

The Scientific Films Association, now three years old and without to date any official subsidy or grant, has done much laudable pioneer work in the field of appraising and cataloguing scientific films, and in promoting an interchange of news about films of scientific value. The fact that in 1939 there was only one Scientific Film Society and today there are over thirty in Britain, is a healthy sign that the film for science is on the move in the specialised 'non-theatrical' field. Canada, too, has started its Scientific Film Society groups.

Important and encouraging as these developments may be—and the specialised use of films is very important to the scientific worker—they must not deter us from tackling the other side of the problem, with which I began my remarks—the putting of science on to the popular cinema screen.

Of that vast area of screens in the four and three-quarter thousand public cinemas in Britain, cinemas projecting celluloid continuously for at least two-thirds of the day and in many cases for seven days a week, how much space is occupied even remotely with matters of science? Without access to Board of Trade returns, I cannot give you an accurate answer, but I am prepared to go on record that it is less than one per cent. We must remember that eight out of ten films exhibited on British cinema screens are American in origin, and I doubt if we should be successful in telling Hollywood what subjects it should film for us to send our sterling back at a rate of some £20 millions a year. As far as British feature films are concerned, there is practically no scientific work carried out in this country other than that connected with the detection of crime. Priestley, Faraday, Lister and Stephenson—alas they had no wicked ladies to smooth their way to the screen. Science in the cinema is all too frequently on the ' Believe It or Not,' or ' Strange as It seems ' level. The more freakish and mysterious it can be made to appear, the more successful it is considered to be. It is fair to say that there have been serious and quite good feature films made of Pasteur, Ehrlich and the Curies, but these are only three films in nine years. The ubiquitous newsreel rarely carries items of scientific importance or interest—unless they are both spectacular and sensational. The newsreels could indeed be an admirable method of conveying scientific information to the general public, but their producers will require a great deal of education before this can be achieved.

There is room, I have often thought, for a Science Magazine of the Screen, a ten or fifteen minute reel devoted to items of scientific interest related to everyday social activity.

But if such a Science Magazine is made, it is most doubtful if it would get widely shown —such is the reluctance of the cinema exhibitor to permit his screen to be used for anything other than escapist entertainment. A series of this kind, is, I hear, being launched under joint Anglo-American auspices and we must wish it success, but the fact remains that the best cinema screen-space in this country is gripped in a tight monopoly of circuit-controls. This is the major problem to be faced by those who wish to see the public cinema screens used for the dissemination of scientific matters—the Battle for Screen Space —and I doubt if it can be approached with any likelihood of success without strong Government action. I do not undervalue the great strides that are being made in the specialised ' non-theatrical ' field of scientific films, but I ask those attending this Conference to consider whether science should also have its place on the ordinary cinema screens where it can be seen by the millions. The motion picture industry has taken a great deal out of society ; it is more than time that it should be called upon to make its contribution to the common cause.

On the international level, we naturally have great hope that the Film Department of UNESCO will facilitate the interchange of factual films of all kinds between countries, and will especially be occupied with the exchange of scientific films. Not only is exchange important, but here again the arrangements for showing must be considered. It is no use bringing to Britain the recent films of Canadian agricultural research, or of Soviet medicine, or of West African health services, if these films are only to be seen by a restricted few. The distribution and wide showing of films of scientific matters are the vital problems to be solved.

The specialised audiences catered for by the development of ' non-theatrical ' methods will go on growing, make no mistake about that, but it is now time to attack the solid resistance that exists towards a more responsible use of the public screens in general. That indeed will be a D-Day in the battle for public enlightenment in general and science in particular.

**Dr. H. Shaw**

More than twenty years ago, Sir Henry Lyons realised that the public knew little or nothing of the large amount of research which was being carried on for the benefit of industry, since the published accounts of it were written in language too technical for them to understand. Consequently there was no means by which the Research Associations and Committees could inform those who may be interested in such subjects but who did not possess sufficient technical or scientific training to read their reports with profit.

It occurred to him that it was well within the province of the Science Museum to arrange for periodical exhibitions at which Research Institutions could bring before visitors to the Museum such interesting results as they had obtained and for which they desired publicity. Such exhibitions he considered would be of real utility, and consequently he reserved one of the galleries of the Museum for the accommodation of exhibitions bearing upon the scientific results of Research Associations, and upon technical operations of related industries. This experiment proved successful, and up to the outbreak of war, over seventy ' Special Exhibitions ' had been staged at the Science Museum.

Today, at the conclusion of a second world war, the position is modified only in so far as the field of scientific research has been enormously extended ; while the general public, having become increasingly conscious of the reactions of science on their everyday life, are pressing for reliable information regarding all branches of scientific research. The gallery at the Science Museum which was reserved by Sir Henry Lyons is still available for the holding of special exhibitions which will contribute to the better dissemination of scientific knowledge.

Special exhibitions vary widely in their form and purpose, but may be roughly grouped in one or other of the following categories, although in certain cases an exhibition may have claims to more than one group.

(1) Purely educational—Exhibition of Chinese junks. Cloud photographs. Photo-electric cells. Solar Eclipse Exhibition, etc. (2) Historical—Centenaries : of which we have had many. (3) Research—Rubber Research Exhibition. Very Low Temperature Exhibition. Physical Society's Exhibition (Research Section). (4) Industrial—Physical Society's Exhibition (Main Section). Plastics Industry Exhibits. Of these, groups (3) and (4) aim to present up-to-date scientific news to the public in an acceptable form, and in such a way as to educate the visitor in the principles of the subject, or to give him an idea of modern development.

A good example of this type of exhibition was one dealing with Very Low Temperatures, which was held at the Science Museum in 1936. This exhibition presented a practically continuous programme of interesting demonstrations, and was supported by a series of specialist lectures, each given by a competent expert, while in the case of another exhibition, a number of interesting films relating to the subject of the exhibition were shown at frequent intervals throughout the period of the exhibition.

Our experience is that the optimum period for an exhibition of this kind is from one to three months, as anything shorter than one month does not justify the necessary effort, while on the other hand the attraction of such an exhibition begins to diminish after three months, and by the end of six months it becomes a normal part of the Museum.

The usual procedure is for the Museum to place a gallery at the disposal of the ' Research Organisation,' which then arranges and finances the exhibition with the exception of warding, light, power, water, gas and compressed air, the cost of which is normally met by the Museum. Technical attendants are also available to demonstrate exhibits, and guide lecturers give lecture tours of the exhibition.

The choice of suitable subjects is unlimited, and includes a large field which would not normally be included in the Museum collections.

Many years ago the Science Museum possessed a considerable number of ' Circulation Sets ' of scientific and engineering exhibits which were maintained at the Museum and circulated to provincial educational establishments, in a manner analogous to the excellent Art collections which are still sent out by the ' Circulation Department ' of the Victoria and Albert Museum. Each science ' set ' at that time consisted mainly of a small collection of scientific instruments or of mechanical demonstration models the circulation of which was discontinued nearly forty years ago. The question of renewing this service, but with more desirable exhibits, has been reopened from time to time, but no satisfactory solution of the problem has yet been produced.

Enquiries have been received from time to time regarding the possibility of transferring to the provinces certain ' Special Exhibitions ' which have been shown at the Science Museum, but it has only been possible to arrange for this on one occasion, as the primary difficulty, that of cost, has hitherto proved to be an effective barrier. Considerable time and effort is expended in planning, collecting and arranging instructive material for these exhibitions, and the transference of such exhibitions ' in toto ' to other centres would have a very instructive and stimulating effect, and would be of undoubted interest and benefit to the community in general. Unfortunately no official funds are available at present to meet the cost of transporting or transferring such exhibitions.

The only available information regarding the cost of circulation was provided by the ' Rubber Research Exhibition,' which was exhibited at the Science Museum for six months in 1934–35. The cost of this exhibition to the Rubber Growers' Association was £1,850 (£1,100 of which was accounted for in salaries for the scientific and technical demonstrators) and the exhibition was seen by over 300,000 visitors.

It was then packed in three railway containers and taken to Manchester, where it was exhibited for two months and attracted 60,000 visitors. The cost of the Manchester exhibition was £850 (including £470 for salaries and £125 for transport).

Finally, it was taken to Edinburgh, where it was on view for ten weeks and was visited by 58,000 people. Total cost in this case was £900, which included £600 for salaries and £120 for transport.

In considering these figures it should be pointed out that the Rubber Research Exhibition incorporated a considerable number of demonstration exhibits which required the continual attendance of staff of technical experts and demonstrators. There is no doubt that most of the special exhibitions could be circulated to three or four different provincial towns at a total annual cost of under £1,000.

If, when planning a special exhibition, it was realised at the outset that the entire exhibition might be required for display at several provincial museums, where facilities for the supply of compressed air, electricity, water and gas might be limited, the exhibits could be designed and constructed accordingly. It may be that in some cases, the limitations thus introduced would render the exhibition unsuitable for display elsewhere, but doubtless these cases would be infrequent. In this way it should be possible to build up a series of modern educational and informative exhibitions which would be available for circulation to provincial museums or indeed in exceptional cases to museums throughout the Empire.

There is no doubt that many persons, when visiting even the smallest exhibition, look for some descriptive guide or handbook, giving such information about the exhibition as one would normally require.

At the Science Museum we have usually proceeded on the assumption that it is our business to provide sufficient notices to explain the general purpose and lay-out of the exhibition, and to enable the visitor, if he so desires, to understand the exhibition unaided, and also to furnish a descriptive label with every exhibit, so that the visitor can acquire the full educational benefit of the exhibition, without having to purchase a catalogue.

Even with all this information freely available, there is still a general desire to take away some publication dealing with the exhibition, particularly when the price is low. Recent experience shows that about one in ten of our visitors purchases the guide to the exhibition, and during our recent exhibition, visited by over 564,000 people, we sold approximately 40,000 catalogues.

A small and simple booklet, which outlines the purpose and nature of the exhibition generally, suffices for the casual visitor, but a more detailed publication incorporating descriptions of every exhibit, is keenly sought after by the more serious visitor. A more elaborate publication, which at the same time tends to become more complicated, is in my opinion undesirable. The question of advertisements, whether or not they should be admitted, and if so, their arrangement and number, is one which could be discussed at considerable length, but is best settled on its merits on each occasion.

**Dr. M. B. Hodge**

I WISH to speak particularly from the point of view of the provincial museum, and of the Museums Association itself. Dr. Shaw has dealt with the work and with the potentialities of one of our great national institutions; but there are in the country some eight hundred other museums, large and small, which I believe—and my colleagues of the Museums Association do firmly believe with me—are playing an extremely important part in the dissemination of the results of scientific investigation and their interpretation to the public.

The majority of museums in this country grew up in the nineteenth century, very largely, of course, as a direct consequence of the great surge of scientific discovery in that century. They were to a very large extent concerned with the natural sciences, and to a very much lesser extent with the physical sciences. Furthermore, while the scientific research of the nineteenth century was in the natural sciences concerned very broadly with systematics, and in physical science with the molecular structure of matter, the results were relatively easy for the normally intelligent person to understand. But during the last half-century research has become a much more complex and highly specialised matter, so that it is infinitely more difficult for the ordinary man in the street to appreciate just what is going on in the sciences. It seems to me, therefore, obvious that the museum has some part to play in this interpretation of the work of the scientists to the general public. It can take its place with the other organisations which have been considered this afternoon, and indeed it can provide methods of approach which are peculiar to itself, in that the museum relies primarily on the visual presentation of its story; while, with the very notable exception of this great Institution itself, and its evening Discourses, the other agencies rely almost entirely on either the spoken or written word or the photographic image, whereas a museum can actually present the three-dimensional objects themselves, which will illustrate the story it requires. But there are certain difficulties in the way, which I must stress.

Mr. Ritchie Calder said that he regarded the trained journalist as the best-educated man in the world. I am not going to quarrel with him on that point, but I would like to say that we in the provincial museums look upon ourselves to a certain extent as Jacks-of-all-trades. In the eight hundred provincial museums in this country to which I have referred, the professional staff generally is of

the order of one to three or four, and they must attempt to deal not only with natural and physical sciences, but very frequently with archaeology, local history, and even with the fine arts ; and they are very frequently called upon, as I know in my own case, by the local press for the interpretation of certain scientific events. In fact, very rarely a week passes, but what the local Curator is rung up by the local paper, and asked for his opinion on some matter of scientific importance.

The provincial museums are usually under the control of the Local Government Authority, and their maintenance is a permissive and not a statutory obligation, which means that they receive no direct grant from the Treasury. The cost of their upkeep falls entirely upon the local rates of the towns in which they are situated ; and it therefore follows that the museum must be content with a proportion of such funds as are available after the statutory obligations of the authority have been met, and that consequently very few museums, except those in the very largest cities of the country, have funds adequate to meet the cost of a changing series of scientific exhibitions on anything like the scale of those magnificent exhibitions which Dr. Shaw has been referring to in the Science Museum.

There is therefore a place for the circulating science exhibition, and I believe the local museum is the place in which it could best be held. Local institutions and the Museums Association would very much welcome the setting-up of some central Bureau, to which they could refer for information, for assistance in organising local exhibitions, and for assistance in publicity for the exhibitions which they do set up.

**Dr. O. J. R. Howarth, O.B.E.**

In view of all that has been said there is no need for me to urge against any possible opposition what I hope will be the outcome of this conference, namely a request to the Council of the British Association to examine and implement the broad desires at any rate of this conference.

It is probable that in organisation, science has too often tended to dissipate its strength by setting up institutions to do particular things, without considering whether there may be already well-established organisations which might do these things more simply and easily by gearing a new bit of mechanism on to the existing power unit. The subject of this conference offers a clear case in point. We are considering the question of the dissemination of scientific information to the public. The British Association was founded 115 years ago to do just that.

It might then be asked why, if the British Association had done what it was founded to do, should it be necessary now to discuss this question at all. One reason may be the tendency of science to dissipate organisational effort : another, a certain timidity on the part of the Association, in the past, to extend the scope of its activities. Latterly, there has been evidence that that timidity is no longer to be apprehended. The brilliant historical introduction to the working committee's paper on which this conference is based, ought to be regarded as a bible by the Association : the Association will surely not be unresponsive to its suggestions.

Let us examine the possibilities of adapting the mechanism of the Association to our present purposes. The purposes, as suggested in the preliminary paper, are, in summary : to bring publicising organisations (the press, radio, and the rest) into touch with the right authorities on all scientific subjects ; to advise and recommend on all matters connected with the publicity of science ; to keep a record of scientific research, everywhere ; to obtain and supply the publicising organisations with scientific news. These requirements fall into two categories : the first two, those of effecting touch and advising, are things to be done on inquiry from individual publicising organisations, the others, recording research and supplying news, are things to be done by the science organisation on its own initiative.

The whole machine cannot be created at a moment's notice ; but the British Association could go some way to meet the requirements at very short notice. In fact, it does now. Not infrequently we are consulted about the right authority or procedure : we are recognised, up to a point, as the consultant scientific organisation on scientific news. To go no further back, it is only in the last few months that we have been consulted, at a meeting of press representatives, on means of improving liaison between science and the Press. It is partly on account of that approach that we have been so particularly gratified at the opportunity to participate in this present conference. It was only on account of the incidence of this conference that the request we had from the meeting of press representatives, to consider the question of improved liaison, was not immediately acted upon.

It has been said that the British Association is recognised up to a point as the consultant scientific organisation. If it emerges from this conference that the Association is the right body on the side of science to sponsor the required expansion of such a scientific organisation, it may be suggested that the Association is competent, again up to a

point, at once to implement some of the requirements of the organisation, and, beyond that point, to fulfil all the requirements without the labour of laying a new foundation from the very first stone. It has the required contacts to start with. It covers a very large field of science, and it possesses organised sections dealing with each major department of science. In passing, reference may be made to the sentence in the preliminary paper in which it is said to be unlikely that such social studies as anthropology and economics could be excluded from the scope of the required organisation. The Association has its sections of anthropology and of economics, and it has its division for the social and international relations of science.

As for international relations, again the contacts exist. There are friendly connections—and it is especially appropriate to refer to them in this conference at which Empire delegates are present—with those associations which have been established in the Dominions and in India, more or less on the model of the British Association ; children, in a sense, of the British Association, and good children, to whom the Association, *in loco parentis*, owes much. The same is true of the American Association for the Advancement of Science, and of the French Association ; and there are others. It is the business of the British Association to inform the public in this country, and it is the business of these other Associations to inform the public in other countries. A federation of effort between these bodies would go a long way towards meeting the requirements specified in the preliminary paper, of a record of research in progress, and of a supply of news to publicising organisations. The Associations for the Advancement of Science do not cover the whole civilised world, but they do cover a large part of it, and they can between them, on the initiative of the British Association, most easily provide the foundation for the new organisation. Their potentialities should be investigated first and at once ; then it would become apparent what gaps exist to be filled.

Moreover, by undertaking this task together, the Associations for the Advancement of Science would not only be serving the publicising organisations, but would be advancing science itself on the side of organisation. The statement in the preliminary paper that there is no learned body or authority in this country to which an inquirer may go to discover the kinds of research in progress in each field, is a lamentable revelation of weakness in the organisation of science. And here is the opportunity to overcome that weakness.

This is not the occasion to go further into details about possible organisation, nor about finance, which would be an important and immediate consideration, whatever form the organisation might take. Nor is it the place to discuss at length such abstract matters as the difference of mentality between scientists and publicists : that a gulf exists between them cannot be gainsaid ; but this conference is sufficient evidence that it is closing. And it is full time that it should close. For in connection with this whole subject of publicity it cannot be doubted that the public has acquired, within (say) the past quarter of a century, a new and emphatic interest in science which up to this moment has outstripped the present inclinations either of science or of the publicising organisations to satisfy it. Once the public really knows, because it is authoritatively told, what benefits to humanity science can really confer, then the public can be trusted to see that it gets them.

I hope therefore that the outcome of this conference will be a request to the Council of the British Association, in consultation with all other appropriate bodies, to consider the need for the organised information of the public in science through the press, radio, films, and exhibits, and to take measures to meet that need.

**Professor Afzal Hussain**

In India we are interested in any efforts that are made to spread knowledge. Literacy in our country is between about 10 and 13 per cent. We have a population of about four hundred million and, not taking into consideration people below the age of five, we have to educate 350 million people. It is planned that we should have compulsory education for eight years, as in many countries in the West. For that purpose we require millions of teachers, and with all our resources, even if we get all the money we need, it is a very difficult proposition, and it is estimated that it will take us forty years to have compulsory education started.

All methods by which we can possibly hasten the process of informing the people about agricultural improvements, public health improvements, scientific principles and realities, and give them knowledge about history and geography, will be most useful to us. Any attempt that is made to produce films that will spread information in the world will be useful because visual instruction is common to all and the language difficulty does not arise. We are very greatly interested in all you are doing in this respect, and I hope you will take the need of India into consideration. It is important because of the number

of people who have to benefit from your enterprise.

I assure you that the Indian Science Congress Association will co-operate with you in any attempt you may make in popularising education, and particularly scientific education, for which you have a special responsibility.

**Professor J. D. Bernal, F.R.S.**

THE general functions of the proposed new Bureau are set out in the paper, but it seems to me that more emphasis might be given to the positive kinds of function. The Bureau should not only answer questions about science, but also discuss and initiate the type of information which the scientists feel ought to be before the public. I think we must recognise that most adults, however high their scientific education, and I include all professional scientists in this group, will spend their working life being anything up to fifty years out of date in their science. The normal mechanism of education will be quite unable to cope with the rapid growth of science and, therefore, a carefully planned continuation of education in science is really the responsibility of scientists as a body. It is their responsibility, and no one else can possibly undertake it.

In considering the various means of communication we have heard of this afternoon, the press, films, radio and television, we have not found that any particular science is best put across in one of these media rather than another. All will have to be used. The scientific members of the Bureau will have to discuss what are the long-term lines of scientific publicity which are required, and then collaborate with the people acquainted with the media to find how those particular lines can be best put across in a co-ordinated manner through a combination of media. There has been, for instance, in the past, a large number of very excellent scientific broadcasts, but no scientific broadcasting policy and an extraordinary variation in the cover and policy of the different broadcasts. All that can be dealt with by making this Bureau a really positive organisation, an organisation that would not only deal with day-to-day information in science as it comes up as news, but the longer term, the permanent scientific education of the public, including the scientists.

**Mr. R. Terrell**

I WANT to draw your attention to an aspect of the complexity of science which has not yet been discussed this afternoon. This is the enormous complexity of what one might call the civics of science—that is, the social organisation of it.

In preparing the Working Party's report, and also in collecting together information for another paper which was produced for the Royal Society Empire Scientific Conference, namely Notes on Current Researches in the United Kingdom, it was our aim to provide a brochure for the delegates which would give some account of what was actually going on in science all over the country so that if any delegates wanted to visit some laboratory we would provide them with facilities for doing so. It became apparent to us as we collected that information that one could go on month after month collecting it. Scientific organisations overlap, laboratories are innumerable and scientists do not know their own social territory. A huge civic organisation has grown up and it is nobody's business to comprehend it all. It is a new branch of civics. There are people whose job it is to know about local government and the constitutional machinery of the country, but no one whose job it is to know the specific organisation of science.

It seems to me that the Bureau as advocated here would provide for the creation of a class of persons whose job it would be to have that information and thus to save an immense amount of time and labour both for scientists and journalists and those whose job it is to disseminate information. It is only by knowing this enormous mass of the civics of science that it is possible to assist a journalist and put him in touch with the right body and the right person in that body, or to assist the scientist in any particular field to meet his opposite number in some other organisation, or know about some piece of allied research, From that point of view I would like to support the proposal that such a Bureau be established.

**Mr. A. G. Cruft**

SPEAKING as a layman, Mr Cruft said he regarded the conception of the Bureau as excellent, but he thought there were many attacks on scientists which were allowed to go unchallenged and suggested that the Bureau, in addition to disseminating scientific information, should also provide information about scientists and should seek every opportunity to refute immediately any erroneous statements written about science or scientists, from whatever quarter they emanated.

**Miss L. E. Higson**

MISS HIGSON drew attention to the fact that dissemination of scientific knowledge began in schools and continued in technical schools, colleges and universities, and she advocated

strong representation of educational scientists among those who would develop and operate the Bureau.

**Dr. Leon Lortie**

I SHOULD like to outline briefly something done during the last five years on the French network of the Canadian Broadcasting Corporation in the way of disseminating science, first to college students and then to the general public. It started five years ago when this radio college work was instituted, and it was primarily intended to be of use to college students, but public opinion was very much interested in these talks, and then they outgrew this very limited scope and the general public are now listeners to these broadcasts. They are given every day, except Saturday and Sunday, from 4.30 to 5.30. Approximately half the programme is devoted to science, namely chemistry and physics, the history of science, botany and zoology. The talks on chemistry and physics were intended at first for sixteen to eighteen years of age, and zoology was for the younger people, and botany for the still younger people. This year there has been a new kind of programme for the very little ones dealing especially with botany and entomology.

These programmes of the Canadian Broadcasting Corporation are on a small scale; an experiment on the lines already outlined by Professor Bernal. They are planned to cover about twenty to twenty-five weeks during the year, and we can think two or three years ahead, having been given an assurance that these talks would go on for some time. We have dealt with practical chemistry, general chemistry, elementary physics and organic chemistry, and this year we are starting on electricity. The programmes on chemistry and physics are correlated to the history of science.

We expect very much from these programmes and hope that they will be extended, and the Chemical Institute of Canada is also trying this year to organise something of the same kind in English, and we should expect this Bureau you have been discussing to be of great help because it should convince the authorities of the Canadian Broadcasting Corporation that it is possible to do it on a larger scale, on a national network, for instance.

Another thing I should like to point out is that very often we find that a nationally known figure in science comes to our country and only a very few know of his visit. We should like very much through this Bureau to be told in advance of the presence of persons in our country whom it would be possible to ask to make some broadcasts, and I hope that this Bureau will be of great help on that, and also that it should endeavour with the Chemical Institute of Canada to organise some of these educational broadcasts on science.

**Mr. Ritchie Calder, C.B.E.**

DR HOWARTH referred to the fact that there existed overseas associations through which we could work, and with which we would work. The Preparatory Commission of UNESCO are now discussing how they are going to organise on a completely international scale, and they are proposing to work through the International Scientific Unions on the research side. UNESCO might reasonably be interested in using this Bureau, and the extension of it elsewhere, as part of their mass media for the dissemination of science and, therefore, we should look for some assistance for this Bureau in that direction.

**Sir Edward Salisbury, C.B.E., Sec. R.S.**

I SHOULD like to refer to two of the means of promoting education. First of all, with regard to museums, I yield to no one in my admiration of the educational services they perform. But it is true to say they have had to perform that service, as it were, with their hands tied behind their backs. National museums have been trying to perform two services with facilities really suitable for only one. They serve at the same time as a respository for research material and also for educating the general public. I am quite sure that the real value of museums will not be achieved until facilities are available to all to perform both functions efficiently. In regard to films, I think it is important to emphasise even more than with other means of education that these should be a means of stimulating thought and not a substitute for it. That, I think, is a particularly pertinent remark in reference to the use of films in schools because it is too often imagined that films as an aid to education will more or less save trouble and not give it. Actually, the amount of preparation which is needed to use a film effectively in teaching is far more than that requisite for the ordinary type of lesson.

After thanking the Chairman and his colleagues for their report and for their contributions to the discussion, Sir Edward Salisbury proposed the following resolution:

> 'That this Conference requests the Council of the British Association for the Advancement of Science, in consultation with other appropriate authorities and bodies, to consider the need for improved

methods of disseminating scientific information to the public through a closer liaison between science and publicising media, and to take steps to establish a central organisation for that purpose.'

The resolution was seconded by Sir Henry Dale and passed unanimously for transmission to the Council of the British Association.

*Postscript.*—The resolution was considered by the Council at a meeting on July 20, when it was approved in principle. The Council called for a report on concrete proposals for putting the proposal into effect.

## Dissemination of Scientific Information: Working Party's Report

During the Conference reported above, references were made to a report on the subject by a Working Party appointed by the Royal Society. Some of the material contained in the report was covered in the papers read at the Conference; the following extracts are reprinted with a view to placing on record other sections of the report which supplement the proceedings of the Conference.

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### Historical Introduction

It is sufficient to consider four periods in regard to our subject:

(1) The first is that of the great scientific educators, Davy, Faraday, Tyndall, Huxley, Darwin and Ball, a period that reached its peak shortly after the middle of the last century. The world of that period was one in which the scale and kinds of scientific discovery lent themselves well to the art of the great individual lecturer and teacher. Demonstrations could be made popular, because the principles to be explained were not hard to comprehend and because their implications for practical living were clear. Few intellectual demands were made of the public, whose curiosity was aroused by the magnetism of certain personalities and by the bearing of their message upon the world of visible things. Moreover, the impact of such exposition upon the popular intellectual foundations of the ecclesiastical order was such as to stimulate a kind of controversy in which few could fail to be interested at one point or another. At the same time the utilitarian philosophy and the violence of the industrial revolution, with its forward-looking, aggressive tempo, combined to sustain an optimism about science that was romantic, materialistic and unquestioning in its vitality.

It can scarcely be denied that this romantic optimism about science has been as much a part of the emotional equipment of revolutionaries and reformers as of the leaders of the civilisation they sought to overthrow or transform. For this reason alone, a proper treatment of the dissemination of scientific information to the lay public today is cardinal to harmonious relations in a world whose various parts are at different stages of development in the transformation of the social order.

(2) During the second half of the century science became more complex, and greater demands were made upon the public mind by would-be expositors, with the result that the period of well-known names drew to a close. The work was fostered, however, by many collective bodies, institutes, workmen's clubs and so on, and, in particular, by the British Association for the Advancement of Science, and the Royal Institution of Great Britain, whose work in this field has been as successful as it has been unremitting.

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Until towards the end of the century the material presented to the public was mainly informative, and little attention was given to the social implications of science. With the turn of the century there came a change. The social system that had been the vehicle of science and industry seemed to many inadequate for transporting its burden into the twentieth century. The romantic and optimistic values that had attached themselves to science were harnessed increasingly to criticisms of society. The discoveries of science were utilised by popular expositors not only to inspire enthusiasm for science as such, but to incline the public mind to the view that science was frustrated by an outmoded social order. This period belonged very largely to Mr. H. G. Wells.

It is interesting to note in passing that the growth of the belief that science was so shackled led to attempts to transform political economy in itself into a science, namely economics, one of the aims of which was to discover, by mathematical reasoning, whether or not the social system, abstractly conceived, was in logic an obstruction to changes in productive technique resulting from scientific knowledge. The scientific approach to the problem, however, has created a special language by which the popularisation of science is still somewhat encumbered.

(3) The phase briefly described above was rudely interrupted by the war of 1914–18 and by the Russian Revolution. The destruction, suffering and seeming futility of the war,

which had brought neither a new world nor any solution of the problems that had beset the old, evoked moods of scepticism and hedonism in the public mind. It was in this atmosphere that certain expositors, especially in the field of physical theory, succeeded in replacing some of the older optimism that had surrounded science in the past by a measure of resignation concerning the inscrutability of first causes. Optimism, at any rate among many people educated in the scholastic tradition, was replaced by a somewhat mystical philosophy.

(4) The fourth period, that in which we now find ourselves, is one in which the dissemination of scientific information has responded to certain important changes both in science itself on the one hand and in society at large on the other.

Secondary education now affects a much larger proportion of the population, and an increasing part of this education is scientific. The popular interest in science is more directly vocational than it was ; people want somehow to be familiar with the development of science, in order to be more successful in their jobs. An ever larger section of the public is engaged in handling products whose emergence from the factory expresses new applications of scientific knowledge. The recent war has put products of applied science into the hands of people who would not otherwise have been aware of the scientific advances involved. The war and the peace, with mobilisation and demobilisation respectively, have caused millions of people to change their occupations, to handle products different from those to which they were accustomed. In a majority of such changes the lay mind is made aware of applications of scientific knowledge. The mobility of labour, growing steadily before the war, and greatly stimulated during the past seven years, has increasingly directed the minds of people to the implications, technical and social, of scientific knowledge. It is of importance that this generalisation applies no less to the primitive peoples of the Colonies than to the people of Great Britain or of the Dominions and India. In West Africa alone an army of between 300,000 and 400,000 men, mostly tribesmen, found themselves handling modern instruments of war. The impact of this experience upon their minds is a subject suitable for a paper in itself. In short, the market for ' popular science ' has grown in bulk and is very largely vocational in content.

It may be said with accuracy that the public appetite for scientific enlightenment is of a character that goes far beyond the heart searchings about astro-physics and relativity that belonged to the 1920's, and this despite the violence and destructiveness of the recent war. The ordinary man is pessimistic about the fate of humanity, but does not feel that there is any mystery about science.

To cater for the newly awakened popular demand, an immense literature about science has grown up and new popularisers have arisen. The scientific writer has been reinstated among the reading public, but this public is better educated and more concerned with social criticism than in the first period examined above. Films and broadcasts have been made on a multitude of scientific subjects and, indeed, the problem facing us now is not that of finding a way to stimulate a public interest in science, but rather to find means of disseminating scientific information to the public in a way that is accurate, rapid and satisfying. The problem is partly personal and partly administrative.

So far we have considered the changing attitude of the public to science and the reflexion of this attitude in that of the popular expositor to his subject. We must now consider certain changes that have taken place in science itself.

Science, in the first place, has become highly organised. The network of laboratories and research stations covers thousands of workers, from directors, professors and demonstrators to laboratory assistants of many kinds. This implies that he who would expound science to the public is obliged to concern himself not only with the technical subject in question but also with what we may call the civics of science. To divorce the civic organisation of science from its subject matter, in order to expound the latter, is to leave the public in ignorance of an important kind of modern knowledge. It is like discussing supply and demand, in economics, without any reference to the existence of the limited liability company, or currency theory without mentioning banks, or the rule of law without discussing the constitution which may or may not embody it. Yet, at the present time the public is less aware of the social organisation of science, in its relation to industry, agriculture and medicine, than it is of the mechanism of local and central government. This lack of knowledge is excusable, since the civics of science are of very recent growth, and the public cannot be blamed for conceiving science in terms of absent-minded professors, whose discoveries emanate from academic cells and laboratory outhouses.

Today, each field of science, its organisation, its personalities and its contemporary problems, are known to very few people outside the intimate circles directly concerned.

At the same time, the work of disseminating news to the public has itself become another civic activity. That is to say, it is carried on

through large social organisations, broadcasting systems, film-producing concerns, newspapers, publishing houses, museums, exhibitions, and so on. In brief, science on the one hand and the dissemination of news on the other have each coalesced into distinct social groupings largely unrelated to each other. The recommendation made at the end of this paper is designed to take cognizance of this comparatively recent development.

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## Conclusions and Recommendations

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(1) Scientific research is carried on by many thousands of specialists, working in an elaborate network of organisations.

(2) The specialisation of science itself and the complexity of its civic organisation are baffling to the public.

(3) The social hierarchy that has grown up among scientists in a world of conflicting values is responsible for a certain caution and conservatism about publicity.

(4) The media for disseminating news and information, whether scientific or not, have also become socially elaborate.

(5) The mobility of labour before, during and after the war has greatly stimulated the public interest in science, an interest that is philosophically optimistic and largely vocational.

In the light of the considerations argued above, certain needs are becoming apparent. These needs are personal on the one hand and administrative on the other.

The present situation would seem to provide scope for a new kind of popular expositor. Just as the elaborate civic organisation of science calls for the administrator who is not *prima facie* a practising scientist but yet who understands sufficient about science to enable him to administer large or small organisations, so the dissemination of scientific information to the public calls for a publicist of a new kind.

The art of the scientific publicist should consist of two faculties : (*a*) fluency in knowledge of the existing social organisation of science and (*b*) ability to grasp sufficient of a particular specialism to be able to make a story of informative value to the general public.

Under (*b*) would come those who are masters either of the written or the spoken word, and under (*a*) persons able to refer scientific stories to the proper expert authorities without delay.

It is for consideration that, just as the professional administrator should perform the valuable function of liberating the practising scientist from the hampering responsibility of administration, so the professional scientific publicist should act as a link between the public and the man of science. Such a link would, of course, not preclude but encourage direct contacts between the scientist and the public. Indeed, since scientists are citizens also, it is reasonable that they should speak and write for the public as much as they choose. The proposed scientific publicist would, however, take from the shoulders of the scientist much of the responsibility for public enlightenment that is now of a routine character.

On the administrative side it would seem that there is scope for an organised but not exclusive channel of contact between agencies responsible for the dissemination of scientific information and the original sources of scientific knowledge. What is needed, in short, is an *Institute of Scientific Information*. Some suggested functions of such an organisation may be summarised as follows :

(*a*) It would maintain, in a readily available form, a record of all scientific research in Great Britain, in the Commonwealth and in the world as a whole. Such information, together with the names of the scientists involved, would be kept in a tabular form, and it would be a part of the daily work of the Institute to keep such records up to date.

It is noteworthy that there is no learned body or authority in this country to which any journalist or other inquirer may go to discover either the location of scientists or the kinds of research in progress in each field.

(*b*) The officials of the Institute would be in telephonic or other communication with scientists in every field. It would be their job to find ways and means of obtaining access to scientists with a view (*a*) to securing the latest information in a form suitable for issue to the Press or the B.B.C. and (*b*) to refer to the proper scientific authority any scientific story brought to them by the Press, the B.B.C., etc.

(*c*) It would supply to the Press and other media complete lists of learned points in pure science, and of technical points in applied science. It would guide Pressmen and others in their search for authorities on all scientific subjects.

(*d*) The Institute would be responsible for keeping the Press and the B.B.C. supplied with a stream of official news releases about scientific matters of interest, whether in the pure or in the applied fields. Such releases, bearing the imprimatur of the Institute, would carry special authority with the Press,

and would do much to discourage fantastic stories and sensationalism, in advance. They would also discourage charlatanism and pseudo-scientific claims to which uninstructed sections of the public are at present widely exposed.

(*e*) Officials of the Institute would be available to advise and recommend on all matters connected with the publicity of science. The producers of scientific films, organisers of broadcasts, planners of exhibitions, local authorities seeking to start exhibitions or museums, etc., all would look to the Institute to help them with advice and active co-operation.

These would be some of the main functions of the suggested Institute. It is proposed that it should be endowed partly from public and partly from independent sources, and that it should be allowed a large measure of freedom to present scientific information to the public in controversial guises. The Institute would be called upon to issue pronouncements upon extremely controversial issues, and it is unlikely that matters affecting such social studies as anthropology economics or ethnology, etc., could be excluded from its scope. Any such exclusion would discredit the Institute, in the eyes of the public, as a pillar of conservative values, from the outset. Like the B.B.C. the Institute would, and should, draw upon itself both criticism and praise. Indeed, the vitality of the Institute would turn upon the sincerity with which it reacted to the varying interpretations of the social function of science.

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It should be emphasised that it is not proposed to set up any organisation whose functions would overlap with those of an existing one having the same aims. It may well be that no better parent organisation for the Institute could be suggested than the British Association for the Advancement of Science, whose work in this field has been famous for more than a century.

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# UNESCO AND UNIVERSITIES

TRANSACTIONS OF A CONFERENCE ARRANGED BY THE EDUCATION SECTION AND THE DIVISION FOR SOCIAL AND INTERNATIONAL RELATIONS OF SCIENCE, JULY 25, 1946

THE Conference was held, by kind permission, in the Hall of the Royal Institute of British Architects, Portland Place, S.W. 1, and took place shortly after the public meetings in London at which the programme of the Preparatory Commission of UNESCO was adopted. In addition to the papers which were read on that day, the Conference had available to it copies of the report by the Association's Committee on Post-War University Education (*Advancement of Science*, Vol. III, No. 9) and the White Paper (Cmd. 6711) on the establishment of UNESCO. In the unavoidable absence of the President, Sir Richard Gregory, the Conference was opened by Sir Alfred Zimmern, who also presided over the first session.

## FIRST SESSION : MORNING

### (*a*) OPENING ADDRESS BY SIR ALFRED ZIMMERN

### (*b*) INTRA-MURAL WORK OF UNIVERSITIES

**Sir Alfred Zimmern**

WE are met here today to consider the relationship between universities, in particular British universities, and the United Nations Educational, Scientific and Cultural Organisation, commonly known as UNESCO, which is being set on foot as one of the permanent standing agencies of the United Nations, designed to fill the place occupied by the intellectural co-operation activities of the League of Nations.

There may be some here who are unfamiliar with the structure and development of UNESCO. Let me therefore explain very briefly how it differs from the organisation under the League of Nations.

There are two great differences. The first is that UNESCO will be governed by a Conference, meeting annually. Under the constitution the annual Conference will be held in a different place from year to year, moving from country to country ; and it has already been arranged that the Conference of 1949 will be held in China, in order to celebrate the 2500th anniversary of the birth of Confucius. So with that occasion UNESCO will acquire a very distinguished ancestry.

The annual Conference of UNESCO will be comprised of representatives of all its members. These members are States, and the representatives at the Conference will

therefore be chosen by governments, presumably in most countries through the Ministries of Education. Some countries, like the United States, Canada and Australia, have no central Ministry of Education, and they will find their own ways of choosing representatives. Each government will choose five delegates, and the UNESCO constitution lays down that these will be selected after consultation with the national commission, if established (there is not going to be one in this country), or with educational, scientific and cultural bodies.

Thus one is justified in expecting that most governments will include among their five delegates at least one who will—I will not say represent the universities of his country (who would be so bold as to suggest that a government nominee can represent the autonomous universities of this country?)—but at any rate act as their spokesman, and thus be made aware of their desires.

The Conference itself will be what its members make of it. It will certainly be one of the most distinguished official assemblies ever brought together. The level and quality of its debates and the subjects selected for discussion in them will depend to a considerable extent on the interest taken by universities in the general work and activities of UNESCO. For instance there are a large number of interesting issues which have been put in the British Association's Report on Post-war University Education. There is no reason why some of these should not be brought up for discussion in what will, I hope, become the greatest forum in the world at this annual Conference. I will not suggest any particular subject, but we all realise there is a very big crisis in the intellectual world at the present time—I will go further, and say a crisis in civilisation; and the annual Conference of UNESCO is the right place to raise and discuss that crisis.

The other main difference between the old and the new order in the field of intellectual co-operation is that in the Geneva system it occupied a subordinate position, and that its finance was mainly dependent upon a single country, France. Under the new order it will be financed through a common budget to which all its members, of whom there are forty-four up to date, will contribute in proportion. Public opinion in the United States is strongly behind UNESCO, and the United States will pay the largest contribution, because its contribution to the UNO budget will be rated higher than that of any other country. Thus the material foundations are being laid for a substantial programme of long-term activities, many of which will be of direct interest to universities and their members.

We meet here within little more than a week after a session of the Preparatory Commission of UNESCO, at which such a programme was adopted. Those sessions were open to the public, but I am sorry to say they were very sparsely attended and the public galleries were practically empty. Some of the discussions about this programme were very interesting, but they were hardly noticed in the Press. They are available for anyone who cares to look at them. This programme will need to be ratified by the Conference in November; but I think it is already possible to mention certain principles of policy, and even certain particular projects, which should be of interest to you here.

The first principle that was implicit in all the discussions of the Preparatory Commission was that UNESCO should respect—indeed by its constitution it is bound to respect—intellectual freedom and the unrestricted pursuit of truth, and that in its dealings with universities and other learned bodies it should pursue the method of co-operation, and avoid anything savouring of an attempt at control.

As to respect for intellectual freedom and the unrestricted pursuit of truth, there is much that might be said, if time allowed. Suffice it to declare that the safeguarding of these precious values of civilisation is one of UNESCO'S major aims, as laid down in its constitution, and that in doing so it counts on the support of universities in every part of the world—not least in this country. And there are all sorts of dangers to which an official organisation concerned with these subjects is exposed, but we count on the universities working for that cause inside to keep those dangerous influences at bay.

What form will co-operation between the universities and UNESCO assume in practice? Two separate forms are indicated in the constitution. The first, to which I have already referred, is co-operation with national educational, scientific and cultural groups, through machinery set up by individual governments. In this country this co-operation will take place, I understand, through what is called a National Co-operating Body for Education. There will be similar co-operating bodies, I think, for science and culture, and I am not quite sure how that is going to be organised; but the universities will of course be represented, and the method of such representation is a matter for you in this audience, rather than for us in the UNESCO Secretariat.

The second form of co-operation will be through direct relationship between the governing authorities of UNESCO and international associations in the very wide

field covered by UNESCO'S activities. Probably everyone in this audience is interested in one way or another in international associations of this kind. They may interest you in your own particular branch of study, or in your capacity of university teachers or students, or as members of a university governing body. There is not as yet—to take the last point first—any international association of universities as such, and the difficulties of forming such an association are obvious.

What is a university? Is a university just what the law of a particular State, say of an American State, declares to be one? I will not enlarge on this difficulty, but I do not think in the very near future we can look forward to an international association formed of universities as corporate bodies functioning in the international field. If this faith is mistaken I shall be only too happy. But there is in existence a young and rapidly growing International Association of University Professors and Lecturers which I commend to your interest, since it will be in a position to play an important part in the work of UNESCO as it develops. The constitution provides specifically for consultation and co-operation between UNESCO and non-governmental international associations of this character, and for representatives of such bodies to sit on advisory committees set up by our General Conference. Indeed it goes further, and even makes it possible, under certain conditions, for such representatives to be invited as observers, with the right to speak, at meetings of the General Conference itself. That might be a very useful provision on occasion, if some particularly burning problem came up and a specific body was qualified to express the academic or scholarly view on it.

Co-operation between UNESCO and specialised international associations may take many different forms. One is exemplified by the draft agreement already drawn up between UNESCO and the International Council of Scientific Unions, under which various forms of assistance are contemplated for the work of the Council and its constituent unions. These have hitherto carried on their work with pitifully insufficient resources, in glaring contrast with the sums available to national bodies working in the same fields. UNESCO can at least do something to reduce this inequality.

In the humanities similar co-operation will no doubt be established with the International Academic Union at Brussels, which has been carrying on a number of tasks for many years past under similar difficulties.

In the social sciences, on the other hand, no international organisation exists at present, though in particular portions of the field, such as history and statistics, separate associations have been formed. UNESCO's policy here will be to acquaint itself with the conditions in each case, and to stand ready to help in any way that may seem best for the common cause.

Another sphere of co-operation is in the promotion of exchanges of university teachers. It is not likely that UNESCO will itself make the detailed arrangements for such exchanges. It does not propose to supersede existing agencies; but UNESCO will act as a clearing-house for them, and a centre of information for them, and will, I hope, perform a useful function in assessing their results in the light of experience from many different countries. There is a great deal to be said on this subject since the foundation of the Rhodes Scholarships forty years ago.

Let me say a few words about certain particular projects in the UNESCO draft programme. It is proposed to examine, perhaps in small conferences rather of the type of a Royal Commission, the existing arrangements in different countries for preparing young persons for careers involving continuous or frequent international contacts. These include not only diplomats, consuls and other foreign service officers, but also members of the Colonial Service, bankers and businessmen engaged in foreign transactions, journalists specialising in foreign affairs, and persons engaged on work such as that of the British Council and other kinds of educators. In some countries there are special institutions on the graduate level either for preparing candidates for being tested for such careers or for training them after their selection. In others, the matter has been left largely to chance or to private enterprise. It is too early to prejudge what such an inquiry would reveal, but it is at least probable that when some form of organisation, based upon the best results attained in the past, has taken shape in different countries in this field, there may be a regular interchange both of teachers and students between such institutions.

If this interchange of teachers and students between foreign services were to happen, say in five or ten years time, it might bring about by degrees a considerable change of atmosphere in certain quarters which have been subjected to a good deal of criticism—by no means all of it justified. I am one who has served as a temporary official in the Foreign Office, and I make bold to say that some of the criticism levelled at that institution is not wholly justified; but no one would go so far as to say the chancellories are not capable of improvement.

It is probable that UNESCO will undertake one such study or inquiry on the university level every year, but the Preparatory Commission did not wish to commit itself to further projects at this stage. Suggestions from university bodies or from individuals as to other possible lines of inquiry would be welcomed.

The subject of the teaching of international relations at universities has been a standing dish at the International Studies Conference, which has been in existence ever since 1929, and has branches in a number of countries. This has enabled historians, jurists, sociologists, economists, political scientists, geographers and teachers of international, or, I should say, inter-governmental relations in the narrower sense, to meet and exchange their views ; and I think this has enabled all of us to realise that international relations is not a self-contained academic subject, but needs to be taught in close relationship with neighbouring disciplines. In Oxford, for instance, it has taken its place as what is called a ' special subject ' in the Honours School of Philosophy, Politics and Economics. The day has passed when international relations could be conceived as beginning and ending with a study of the League of Nations. It is contemporary history, in all its range and variety, or it is nothing. Indeed in the preceding enumeration of disciplines I am not sure that I should not have included nuclear physics. I remember feeling somewhat of a trespasser on fields outside my concern, when in the thirties I recommended my students to find their way to the science library and read books on some of the metals which were assuming importance in the diplomatic world. Today it is the denizens of the science libraries and the laboratories who are crying out to the political scientists and the philosophers to come over to Macedonia (or should I say Bikini ?) and help them to deal with the Frankenstein of their own creation.

The moral of all this was already drawn for us in the British Association Report on Post-war University Education. We must integrate our university studies, and so try to integrate the minds of our students—and not their minds only, but the whole of their personality.

Only one word more. UNESCO hopes itself to undertake two small educational ventures of its own.

It is proposed to set up at the UNESCO headquarters in Paris a Study Centre in International Relations for specially selected graduate students from the member states. In the first instance this would probably take the form of short courses, lasting for say six weeks, and enabling three or four such courses to be carried on in the course of a year. The courses would include lectures and group discussions conducted in part by members of the Secretariat staff, and in part by scholars from university institutions within easy reach. Several such courses could be arranged for during the year.

The other proposed experiment is a summer course for a group of carefully selected younger teachers, perhaps one hundred in all. This would be held outside Paris, but in some centre where good facilities for both study and recreation are available. The teachers from more distant countries would probably extend their stay in Western Europe by visiting some of the institutions to which their colleagues in the course are attached.

The proposals that I have mentioned do not, of course, exhaust the matters in our programme which are of interest to this audience. Others will no doubt be mentioned in the course of the day. But I think I interpret the feelings of all those of us who are engaged in the UNESCO venture, when I say that we feel it is more important that what we undertake, at this or any other stage, should be done well, than that we should embark on an ambitious and high-sounding programme.

UNESCO will be what the member nations make of it, and, in the member nations, it is the teachers and students at all levels, but above all in the universities, who matter most. It is for that reason that we feel particularly grateful to the British Association, under the inspiring leadership of Sir Richard Gregory, for organising this Conference ; and to you, ladies and gentlemen, for sparing the time to attend it.

### Dr. J. C. Maxwell Garnett, C.B.E.

### The British Association Committee's Proposals

THIS Conference on Universities and UNESCO is to discuss a Report presented to the British Association two years ago by its Committee on Post-War University Education. Had the usual Annual Meeting of the Association taken place this year, it would have considered the Report, perhaps in Section L (Education) under the presidency of Miss Lynda Grier, whom we are glad to have with us today, and who will take the chair for us at the second session. The Association felt that it would be a mistake to keep the Report waiting for public debate until next year's Annual Meeting in Dundee. The Report has much to do with UNESCO, and UNESCO's headquarters are about to move from London to Paris.

As you will see from the Report in your hands, it originated in a Conference on

Science and World Order held in September, 1941, by the British Association's Division for the Social and International Relations of Science. The promotion of closer international relationships after the second world war was one of the subjects then raised. The Committee on Post-War University Education was subsequently appointed to consider, in addition to problems of rehabilitation, the general policy and methods of university education, with a view to promoting international collaboration and the service of the community as well as the replanning of university studies ' in accordance with modern conceptions of the interrelation of different branches of knowledge, particularly those of science and the humanities.'

The Committee was at work for nearly three years. Its international character became more pronounced after the first year, when it came to include members from Belgium, China, Czechoslovakia, France, Greece, Netherlands, Norway, Poland, U.S.A., and Yugoslavia. We are fortunate enough to have Professor Jean Timmermans, the member from Belgium, to preside at our third session today. Among the members of the Committee from this country were the present Vice-Chancellors of Birmingham and Bristol Universities, as well as Dr. Julian Huxley and Sir Alfred Zimmern, now of UNESCO.

The Committee's First Interim Report, presented in September, 1942, and published in the following month, was, I believe, the first public pronouncement in favour of the United Nations creating an International Education Organisation after the war. The Final Report, adopted on July 3, 1944, further proposed that a ' world centre for science,' such as Dr. Raestad of Norway had described to the British Association in March, 1943, ' might well form part of the International Education Organisation,' which should also be supplemented by ' multilateral cultural conventions.' Here then we have all three constituents of UNESCO.

But the chief importance of the Report lies in its insistence on the need for integrating university studies so as to form a single whole in the mind of each student, and so as to link the students to one another and to their communities both national and international. The most brilliant specialists should realise the part their speciality plays in the life of mankind and of their own nation, while the average undergraduate should be offered a course of study that will, as Professor Whitehead puts it, fuse ' religion and science into one rational scheme of thought ' and so afford a better education for citizenship than most universities offer at the present time. Even if no final integration is possible without entering the realm of hypothesis, that is, after all, the way of discovery which has led to the substantial achievements of modern science.

The research work of universties lay outside the Committee's terms of reference. But the Committee insisted that research was not only an essential function of every university but should also be undertaken by almost every university teacher. The Report quotes the first Principal of Owen's College, Manchester : ' students come to the university to drink the sparkling water from the running stream of truth and not the green mantle of the stagnant pool.' University teaching is not to be divorced from research.

On this understanding the Committee recommended three major developments of undergraduate teaching. They are :

1. The institution of Honours and Pass Schools of ' *Philosophy, Natural and Social,*' combining natural science and humanities ;
2. The introduction of sociology and citizenship into all specialised Honours Schools, particularly those in Natural Science, Applied Science, and Technology ; and
3. The widening of the mind of every undergraduate to include some understanding of those concepts of the world which have their origin in natural science.

I have a few words to say on each of these proposals.

The first—the new Schools of ' Philosophy, Natural and Social '—treats the chief problem of philosophy as not so much to explore ultimate reality as to construct in men's minds a working model that fits all kinds of human experience, not only of space and time, but also of aesthetics, morals, and religion. This implies some study of psychology as an experimental science. Undergraduates who read ' Philosophy, Natural and Social ' will need the continuous guidance of tutors in whose minds the entire course has already taken shape as an organised whole. The Committee hope that the war work of a sufficient number of the younger dons will have widened their experience of public affairs and deepened their interest in the question how their universities can best help to educate some of the leading citizens of the post-war world.

During the last fifty years, however, universities have become increasingly preoccupied with the training of specialists. Many of these specialists have had little knowledge of the workings of democracy or of its achievement in social welfare. The Report proposes two steps towards remedying this

defect in university education. They are to be taken as more and more university teachers gradually learn to bridge the gulf between science (and technology) on the one hand and humanities (including economics) on the other. The first step would be ' special interest ' courses designed to help students in their future professions : for instance, by introducing medical students to social problems through lectures on public health, the administration of public health services, vital statistics and human needs ; or by offering engineering and chemical students an interesting course on industrial history, industrial welfare, and works organisation, including relations with Trade Unions. The second step would consist of more general courses and discussion groups on such topics as citizenship, international affairs, social and industrial relations, anthropology and psychology.

' Science for All ' is the name given by the Committee to their plan for providing every undergraduate with a stimulus and an opportunity to integrate his own special or partial interest, whatever it be, with a philosophic outlook on the whole world of things and people, so that his university education may fit him for his whole environment, spiritual, human, and material. His spiritual education is plainly imperfect—his character or personality is impoverished—if he has never been thrilled by the achievements of the human intellect in scientific discovery. His education as a citizen is defective if his mind has no contact with those of scientists whose help he may need in realising his ideals for his country or his world. And his public work, as well as his private behaviour, is bound to suffer if he lives in ignorance of the simple facts of everyday life in a scientific age.

' Science for All ' is essentially a human, or world-wide, rather than a national discipline. It may be studied equally well in any university in any country. Its range is indicated in the Report and alternative courses of lectures and classes are suggested. The Report recommends that none of these should be compulsory for all students, and that no examinations should be held on their subject matter. But tutors ought to talk these courses over with their specialist pupils and try to complete the process of linking up ' Science for All ' with each undergraduate's central core of studies and with his whole outlook on life.

The purpose of such talks with their tutors goes beyond the organisation of the pupils' reasoned thought. University education—and, indeed, all education—is also concerned with the emotions and the will. It should cultivate right feelings towards the objects thought of, whether material or human or divine. It is for this reason that the Report insists so strongly on the need for tutorial superintendence. Universities where it does not yet exist should work towards such a system as will ensure the personal direction and oversight of every undergraduates' studies. And, since everyone's education in this wider sense may owe more to the influence of friends and contemporaries than to teacher or tutor, the Report recommends that at least one year's residence in college or in a university hostel should be required of every internal candidate for a first degree. The Conference will like to know that a new student's hostel has recently been opened in the University of Manchester, and that Leeds and Sheffield Universities are planning to follow suit.

The Report has a good deal to say of how sixth form work—the schooling of boys and girls during their last two or three years—may best prepare for the university. It should begin the integration of study with philosophy of life. It should lay stress upon the civic implication of all the subjects studied and particularly of natural science. However expert some of the pupils are destined to become in their individual vocations, they are all going to belong to their national and international communities. They must be educated for their ' leisure ' as well as for their ' work.' In their sixth forms, all intending undergraduates should seek to link up ' something of everything ' with ' everything of something ' or the profound study of a specialty, which is an essential part of sixth form work, both as a preparation of the intellectual élite for high honours (and some for research) in the university and as a strenuous intellectual discipline giving to the whole sixth form the sense of doing a real man's job. Half the time spent in class, and most of each pupil's private study, should be given to one special subject into which the particular boy or girl should be encouraged to go as deeply as possible. The other half of the time in class would be spent on linking up the deep study of an individual specialty with the wide study of much else. Consequently, a boy or girl whose speciality is natural science should not be expected by the examiners for open scholarships to possess so much specialised knowledge as has hitherto been assumed. What will then be omitted at school can be better acquired at the university.

All examinations for entrance scholarships to universities should attach real weight, not only to the candidate's intellectual promise as shown by excellence in his own special branch of study, but also to his interview with the examiners, to his school record, to his Essay,

and to his General Papers, which should include passages for translation from several foreign languages. These General Papers should be designed to discourage intensive preparation and no set books should be prescribed for them.

The Report makes a number of suggestions for world-wide university collaboration. The British Association's Committee would like to see a World Council of Universities formed for co-operation between national councils of universities, and this World Council should, says the Report, work hand-in-glove with a Universities Committee of the International Education Organisation proposed by the Committee and now about to come into being as UNESCO.

Some of these suggestions no doubt will be discussed at our third session this evening, including the formation of the World Council of Universities. As we have been reminded, there is already in existence an International Association of University Professors and Lecturers, and that would be an important constituent or unit in any World Council of Universities that may some day be created.

The Report would have UNESCO help (*a*) to raise the standards for entrance to most universities ; (*b*) to give wider publicity to arrangements for students coming to universities from abroad ; (*c*) to develop, in co-operation with existing machinery, schemes for international student exchange ; (*d*) to make grants in aid of the exchange of students and teachers and (*e*) to do something in regard to the teaching of international relations in universities.

One more practical suggestion, before I end this summary of the Report so far as it concerns UNESCO and the intra-mural work of universities. The Committee propose that, apart altogether from the academic study of language and literature, every university should require its students to be able to make themselves understood by speech and writing in some one universal 'auxiliary means of international communication.' Professional diplomats can, of course, transact their business in a common language. Since it ceased to be Latin it has generally been French, and in future may very well be English. The last century saw a steady increase in the number of international conferences where the delegates represent, not Governments or Foreign Offices, but unofficial persons interested in some aspect of science, art, law, industry, commerce, human welfare, or social justice. Such unofficial conferences are likely to become much more frequent in future. Skilled interpreters enable all the delegates to grasp what goes on in the actual conference chamber. But when they meet each other socially, they may not be able to understand each other ; and yet their informal talks might do more than set speeches to promote the success of their conference, free interchange of ideas, and that good understanding between nations on which peace depends. The Report suggests that university students should devote one long vacation to acquiring such an 'auxiliary means of international communication,' and it points to Basic English as the best means now available. Basic English has only 850 words as against 240,000 in the English language or 100,000 in French or 80,000 in Italian ; and a sufficient acquaintance with Basic English could be obtained in a few days by the very many post-war students who can already talk English.

The chief importance of the Report, which has been so briefly summarised, lies in its insistence on the need for integrating university studies so as to form a single whole in the mind of the student.

**Professor Bonamy Dobrée**

**Civic Universities and our need for more of them**

I DO not propose to spend much time in describing our civic universities ; they do not differ in essential idea from the older ones, and the two groups are rapidly becoming more and more alike. The main difference is that the new universities are for the most part non-collegiate, while the old are based on colleges (I refer to England only), and that the old have, and for a long time will have, superior cultural amenities and a whole weight of tradition. A further difference, which it is hoped will soon be adjusted, is that, thanks to the present system of scholarships, the pick of young brains go to Oxford or Cambridge, which is bad both for Oxford and Cambridge and for the other universities. The civic universities, however, perform the essential function of enabling a far larger number of people to obtain education at the highest level than was possible without them ; they have increased the number of places where fundamental research takes place, and where ideas can be discussed ; moreover it is possible that their actual physical presence in cities has impressed upon the people as a whole that there is such a thing as higher knowledge, that a nation cannot get on without it, and that it is to an ever greater extent becoming available to those capable of profiting by it. They also provide a large number of trained technicians and the best grades of teachers.

It is no part of my argument to re-state what we all know, namely that this country lags far behind all other countries that form

part of our Western European civilisation as far as numbers in universities go. A smaller proportion of our population attends universities than in any other country of comparable development. This may or may not be a reason for us to increase our numbers ; a more cogent reason lies far deeper.

The reason is, put simply, the increasing complexity of our civilisation, which demands an ever larger proportion of men and women, not merely trained in the technicalities of any of the specialised branches of work they pursue, but capable of understanding the inter-relation of these branches. The need for university-trained men and women is exactly on a par with the need for more and more boys and girls to undergo secondary education. It is, almost, a natural corollary. Just as we found a hundred years ago, say, that we could not afford to have an illiterate population, and later that we needed to have an ever larger proportion of rather more highly trained people, so now it is becoming apparent that we must have a larger proportion than ever before of people who have at least been in close contact with the best and highest that education can offer.

Let me develop this a little—and the line of development is obvious enough : or, rather, there are two obvious and at first view divergent lines. The first is the very much greater knowledge required in any branch of intellectual or practical activity : more and more, in any branch, the knowledge of how a thing works must be reinforced by the knowledge of why it works in the way it does—'why' being merely a more remote 'how.' This is true in engineering, in education, in agriculture, in literature, in medicine, in government. Fundamental knowledge, I suggest, has ever to seep deeper and deeper down through the various strata of a differentiated society. Thus one of the factors which makes a more general diffusion of knowledge of vital importance is the ever ramifying specialisation, requiring an ever-increasing depth of knowledge.

If that were all, perhaps technical and training colleges, duly linked with universities—more closely than they now are—might fulfil the purpose. But something more is required. As a counterweight to the increasing narrowness of specialised knowledge, the knowing more and more about less and less, is the widening of the field of knowledge essential to a community which is going to flourish, even to survive, in the circumstances of today. We are faced, in fact, with the imperative necessity, not, of course, of knowing less and less about more and more, but of being at least aware, intelligently aware, of a good deal of the more. We must aim at achieving an ever larger proportion of our population who understand the relation between things, who have a grasp of the relativity of things. We know now, as we never realised clearly enough before, that this is one world, that everything in human life, not only peace, is indivisible. The need spreads all along the line, at every level, in every matter of human thought and activity : 'all knowledge is one' is no mere idle phrase ; it is a truth that must be grasped if we are not to dwindle. As a rough illustration we might say that the engineer must know something of economics, the economist something of psychology, the psychologist something of anthropology, the anthropologist something about geography, the geographer something about history, the historian something about literature and the arts, and about economics . . . and so on, all this being a ludicrous simplification. One might add also that an advanced and highly complex democracy demands an informed electorate.

Universities are—not by definition but by the way they have grown—the institutions where a large number of knowledges are pursued at the highest level ; where a respect for knowledges other than one's own is inculcated, and where all can, if they wish, become aware of the implications of other knowledges. For this reason there must be universities ; if the advancement of knowledge in different spheres were the only desideratum, then research institutes would meet the case. It is the cross fertilisation of one knowledge by another that is the important thing, which universities alone can, if they wish to, achieve.

But I am here today to argue, not that there should be universities, but that we should have more of them ; and I feel I can do no better than to develop what I said earlier, namely that a deeper level of knowledge of any activity is required at an ever lower level. Soon the farm hand will need to have at least a diploma in agriculture ; and more important still, we need an ever-increasing number of men and women—as workers and as citizens—to co-relate the various activities, not only as enlightened administrators, but to arrive at some sort of cultural synthesis, in short, to consider values. A clear idea of values—of the relative importance and worth of various things and diverse aims—is the imperative need of our chaotic civilisation. There must be—unless we care to court disaster—a far larger number of informed men and women bringing their minds to bear, not as specialists, but as developed human beings living their lives in society, on the problems of our emergent industrial, possibly nuclear-energy, civilisation—people who can be relied upon to take

initiative and act upon the knowledge they have got. I do not myself think—though speaking as I do under the aegis of the British Association I speak with the maximum diffidence on this point—that our need for more universities arises merely out of the fact that we need, ultimately, 150,000 scientists, to use the Barlow Report figures. I do not believe we could produce anything like as many people whom one could properly call scientists, for the real scientist is a creative person at a high level, and creative people at a high level are not to be numbered in any sphere by their hundreds of thousands. I venture to think that technological colleges, developed and linked with universities as suggested in the Percy Report, would produce the kind of scientists needed—if that were all that really were needed.

But surely, what we need in this country is a far larger number of men and women, whether they are scientists or not, trained to grasp ideas, and aware of the conditions upon which our highly complex life is lived. We are, as a people, appallingly ignorant of the ordinary things of life which enter into all our lives, such as dietetics, health, child psychology; we are equally ignorant of the framework of our lives, of the Empire without which our whole manner of living would be altered, of foreign peoples, of foreign ideas, of the thousand and one political problems upon which we are all expected to vote. If we are to survive we have to have a far larger proportion of our citizens with a competent knowledge of, at least, what all these things are about. It is only by greatly increasing the university population that this diffusion of knowledge can take place.

The phrase 'diffusion of knowledge' has a familiar and, for some of us at any rate, a somewhat sinister ring. For though in universities we use the phrase often enough with a fine reassuring sense of concrete ideals, and even of duty done, if the nation is to gain benefit from more universities we shall have to re-examine the phrase. Diffusion of what knowledge? we shall have to ask; diffusion among whom? The questions, of course, are inter-related.

For whatever the Barlow Report may claim as to the wastage of good intellectual material which goes on thanks to our small university population, I am pessimistic enough to think that having more universities will mean diffusing knowledge among a rather different type of person from the one we have nurtured, or persuaded ourselves we have nurtured, at universities so far. I think this is all to the good. Of course we shall still include the other, and part of the aim of university activities must always be to produce the profound scholar, the brilliant research discoverer; but I think that a far larger proportion than at present of the university population will consist of the rather-above-average intelligent person, with vitality, curiosity, and interest in the world about him. What we will have to aim at is not the production of a mere technical expert, and no more—since for that to be worth while the expert must be very expert indeed—but a man sound at his technical job and at the same time imbued with an attitude of mind towards things in general. We must have thousands more people able to tackle the everyday problems of living, of living in a community in the new, rapidly changing society, taught how to grasp essentials, to understand generalisations, with a wide outlook on the world and a sense of values. We cannot, in the crisis of the next twenty-five years, do without such men and women in their thousands to help evolve new patterns of living, not only within our own country, but in relation to other countries.

I have spoken of more universities rather than of enlarging our present ones. The question is, how far can we usefully make our present universities larger? Oxford and Cambridge have already said, quite properly in my view, that they can expand no further, and there is a limit to which other universities can expand, a limit I think stretched a little too far in the Barlow Report. There is an optimum size, varying to some extent for each university; and unless you have collegiate life you can very easily get too big. You lose, not only the sense of community, of common effort which should be a stirring impulse at a university, but also the mixing of various types of mind essential to the building up of whole minds. You cease to educate, and descend to instruction. If we must have a much larger portion of the population made aware of the width as well as of the depth of our problems, as I firmly believe we must, then the only answer to the problem of how to obtain them is—more universities.

## Discussion

### Dr. D. R. Pye, C.B., F.R.S.

As someone who has divided his life roughly into three parts, and spent say a third of it on the staff at Oxford, a third at Cambridge and a third in the Civil Service, and now in London, my thoughts naturally turn to the place that the University of London takes among the universities of the country as a whole. Professor Dobrée has spoken of the Civic Universities, and by that I imagine he had in mind the regional universities other than London; because London University does take its own position with something up

to twenty thousand undergraduates, counting external as well as internal students.

I am now a supporter, and strong supporter, of London University ; and although I maintain a great love for the other two places too, as centres of education, I have a very great belief in the liveliness of the ideas which are going about in London University, and particularly in the direction of broadening the basis of undergraduate studies, while maintaining a central line of study at a high level. It might be of interest to illustrate how we are attempting to do that.

In London University at the moment we are just at the stage of turning a special Honours Degree into a four years' course for which the specialist examinations can be taken in three years, and the undergraduate can have a fourth year after he has qualified in his specialist examination. To take one particular instance ; in the Engineers' Course at University College, we are planning that a boy having completed his specialist technological training in three years, will then have a fourth year of higher study—and by that I do not mean research, because to my mind a year's research immediately after taking a degree does not amount to anything worth having. We are providing courses, for example, in industrial administration and in law, as needed by engineers, with further advanced courses in the particular lines followed for degrees.

So much for one illustrative example of the way in which a highly specialised technological course can be broadened, not at the beginning, so to speak, but at the end. We have also been thinking a great deal about the social sciences, and how far they can be seen as a high-level training. The social sciences have tended, I think, in the past to acquire a rather unenviable reputation for 'woolliness,' if I may put it that way ; and I feel that should not be so, and need not be so. The social sciences have tended to be thought of as a training for social activities, and also to be based a little too much perhaps on economics and to be regarded as a discipline in economics. That is too narrow a basis, and as a discipline on which a degree can properly be based, the social sciences should bring in the modern techniques which have been developed in what I may call the pure sciences, the biological sciences and the sort of things like the influence of environment and nutrition on the physiological development of races ; and there is the whole biological aspect of man's development to his particular environment, the study of which is subject to well-established scientific training. I think we should like to see a degree in social sciences, but with a balanced basis, both scientific and economic, which would in some one direction be carried to a really high level of mental discipline.

I most heartily echo what Professor Dobrée has suggested, that no training of graduates really becomes a proper university training unless the circumstances are such that he can rub shoulders while he is an undergraduate with people following disciplines which are quite different from his own. We are fortunate at University College in having the Slade School of Fine Arts cheek by jowl with the engineers, and the historians with the biologists. But there remains in London generally the lack of residential university life. There are, of course, some residential colleges, and we have started at University College what I hope to see developed more widely, and that is what we call College Rooms in ordinary houses, taken in the immediate vicinity of the College, fitted out as study-bedrooms, with meals actually served in the College refectory, including the evening meal. We are also keeping the College open till 10.30 every evening, so that we get a certain inflow and outflow, with the College to some extent as a social centre for the undergraduates. That seems to me a possible and practicable line of development for achieving this broadened basis of university education which the physical conditions in London make so extremely difficult in present circumstances.

**Professor Lord Chorley**

THIS meeting has been very interesting to all of us ; but if I may say so, it has been divided by a gulf between the most interesting description of some of the work which has been done by the Preparatory Commission of UNESCO, and two interesting and informative addresses on problems of future development in our own universities here in this country.

It seems to me that a closer integration of the two matters is needed, and that where UNESCO can perhaps give the greatest assistance would be in collecting information on these difficult problems from universities all over the world. One very significant thing was brought out in this report of the British Association, and it came out in discussions of the Association of University Teachers. We all feel that we have been working on too-specialised lines, getting into watertight compartments, turning out a tribe of specialists, as opposed to educated and deeply cultured people. My contacts with Professors from some of the universities on the Continent suggest that exactly the same feeling is prevalent there. Only yesterday I had an interesting talk with a Professor from a Spanish university, who said he thought that

in England we were very much more educational in our work at the universities than they are in Spain, and I have heard some criticism from other continental universities, that the greatest mass of their work really consists in preparing people for professional, industrial and commercial livelihood afterwards. He thought one of the reasons why this country had stood up to the very difficult situation of the war was that, particularly in our older universities, we adopted a rather wider type of education, which gavé us an elasticity and an ability to adapt ourselves to difficult circumstances, such as had arisen in those years.

That is all very pleasant and flattering of course for Englishmen, but it seems to me UNESCO with its material resources which it now has at its disposal, and with obviously a capable and efficient Secretariat, could institute a real investigation into problems of this kind over the different countries of Europe ; and if that were done in detail and in a scientific way, it would be of the greatest value.

An enormous amount of this sort of discussion is based on the general sort of feeling that we, as university teachers, have as to what happens ; but it is very seldom supported by any real statistical evidence, because we have not the time, staff or money to do statistical work which is really essential in the investigation of any social problem of this type ; and this is only one of the problems UNESCO may very well take on.

Another one which comes to my mind is the arrangements in regard to students' health. Most people who have had something to do with them, know that the work of students is enormously dependent on whether they are healthy or not, or properly fed and that sort of thing ; and in the civic universities there is always a sprinkling of students who are not at all healthy, with not enough money. They stint themselves of food even when food is reasonably plentiful. This matter of students' health is one of very greatest importance, and is one to which very little attention is given in this country, and as far as I know in other countries ; although there are here and there signs of an awakening interest in it.

This is the kind of picture UNESCO would be in a superb position to investigate, and it could produce a report of such great value, which, if taken up and acted upon, could fundamentally change the whole standard of work in many universities.

There are very many subjects of this kind which should be investigated. To think of a third, there is the impact which we in this country are staggering under at the present time : there is no one in the teaching profession not worried about the effect of conscription, and whether it is better to come before the undergraduate goes to the university or after he has taken his degree, and how the whole thing should be organised. The continental universities have been up against this terrible problem for many years, and there must be very valuable experience there ; and they have different types of conscription. The Swiss system seems to me to be infinitely better than anything I have ever come across, but very few people seem to know much about it in detail, or know about the arrangements made on the Continent ; and I have no doubt at all that just as it is valuable for us to have information, it would be valuable for people of, say, Holland or Norway or Switzerland or Portugal to know the arrangements that have been made in other countries for getting over this very real difficulty. That is the sort of thing UNESCO could investigate with its Secretariat and the resources at its disposal. It will be in close touch with governments which have a great deal of information, and with the universities which have their part of the information, and I should like to suggest that this is the sort of way in which UNESCO could provide one of the greatest and most valuable services to the universities, and indeed to education as a whole in this country.

**Sir Alfred Zimmern**

My colleagues and I from UNESCO have listened with great interest to the suggestions made on UNESCO'S work, but from our point of view Britain is only one of forty odd countries, and if, therefore, those who represent universities wish to press UNESCO to put some subject on its agenda, the thing to do is to go to the annual conference of the International Association of University Professors and Lecturers, to meet people from other countries who have encountered similar problems. If, after discussion, any one subject is selected as being of great importance for UNESCO to take up, bring pressure to bear on us from the international angle, and I am sure we shall listen.

**Dr. A. S. Teixeira**

I am a member of the Secretariat staff of UNESCO, and speak not as a member of its Educational Section, but as a Brazilian who has come a long way to see if he has a contribution to make. We live in such a changed world that perhaps even one Brazilian can give something.

In Brazil we do not have the same problems as in Britain, because our university life is still very new and not greatly developed. Our universities are somewhat

dominated by their higher professional schools, and it is perhaps safe to say that they emphasize the teaching function to the detriment of their research and general education functions. But universities are very difficult to define, and the investigation it has been suggested that UNESCO should undertake could be something through which we could try to see what a university really is.

In Brazil the professional schools, the law schools, the Polytechnic schools and the medical schools are the most important ones. Only a decade ago we instituted schools in philosophy and letters, and in this field we are trying, as it were, to change more quickly; and instead of planting seeds we are trying to bring a little of the European knowledge by transplantation. We have had a university mission in San Paulo, with professors from Europe, especially Latin Europe, France and Italy, and a few from the United States; and in the university of the Federal District where I was Director of Education for some years we had fourteen professors from the Sorbonne to help us to start a school of letters and philosophy.

It is inspiring for me to be present at this conference arranged by the British Association for the Advancement of Science. In the past the great centres of learning were inclined to be somewhat static and conservative and it is encouraging to see that they have decided that they must change with the world, and perhaps lead the world in its changing conditions. The universities have indeed something to give in this great crisis of civilisation in which we live, and if they decide to give it whole-heartedly, assuming the leadership for some of the changes instead of shrinking into the older university function of mere conservation and guardianship of knowledge, university reform will be something like a Copernican revolution.

**Dr. Jucci**

I AM from Pavia University, which is the only university in Italy with colleges like Oxford and Cambridge. The older university in Italy is of the type which you call civic.

Professor Dobrée has argued for more universities in England; in Italy there is almost an opposite need. We have many more universities in Italy than we can afford in these hard times. We have twenty-one or twenty-two universities, and even before the war it was said that the number should be reduced. If we had the means it would be nice to preserve all these universities; and it is really very painful to destroy a centre of culture that has been alive for many centuries, and also sometimes glorious; but on the scientific side particularly we could not carry on without some reduction.

I have listened with interest to the remarks about the need to integrate the specialised curriculum with some more broad and humanistic culture. In Italy we are not quite so much in need of that, because our secondary schools are based on the old classical type of general culture. Thus, before the war, when a student came into the universities he had some good general preparation. Every war, however, debases the state of the culture, and the level of children coming up from the secondary school in Italy is rather poor at the moment.

**Professor R. D. Laurie**

So many items have emerged during this meeting that one must inevitably make a very severe selection. I would like in the first place to allude to the references to the International Association of University Professors and Lecturers, because it falls to me to be Honorary Secretary-General of that body.

In the period between the two wars there was a good deal of interest in academic circles in different countries in the international discussion of specialist topics, and there were international conferences of zoologists, geneticists, geographers, chemists, and so forth.

There was also a series of conferences inaugurated by the Association of University Teachers, in which consideration was given to problems concerning the university as a whole, rather than its separate parts. We asked ourselves, discussing the matter with colleagues from different countries, 'What is a university for? What are going to be its relations with the outside world? Within the university, what are the relations between the staff of the university and the students? Is it a good thing they should live together in hostels, as in Oxford or Cambridge, or not in hostels, as in Scotland and a good many continental countries; or is there a half-way house, as in civic universities and in Wales?'

There are so many problems of that sort. Have we any responsibility in regard to the health of our students? Do we nurse them too much, or have we a responsibility we should consider? Those are the kinds of things that we were beginning to consider internationally, and we had such conferences before the outbreak of the present war, in Oxford, Grenoble, Heidelberg and Switzerland. The war came and the conferences stopped; but the war brought to this country a number of colleagues from universities of other countries, and quite independently of the pre-war movement an organisation came into existence, the precursor of the International Association of

University Professors and Lecturers, and supporters of the pre-war movement are wholeheartedly backing this new Association.

There is this contrast, as I see it, between UNESCO and the Intellectual Co-operation Movement of the League of Nations—the latter was bureaucratic, university teachers knew little of it, and some who tried found it impossible to get into real vital touch. In contrast the International Labour Organisation was an organisation which was democratic in outlook, setting out to get workers and employers all represented on the body; and now UNESCO, with a different kind of organisation, is adopting the democratic outlook. Now one hopes it ought to be the easiest thing in the world to have university teachers associating themselves with the work of UNESCO. Not everybody can be or would desire to be on UNESCO committees and that sort of thing, but Article XI, 4 of the Constitution encourages consultation and co-operation with international non-governmental bodies; and the International Association of University Professors and Lecturers is such a body.

With that encouragement I.A.U.P.L. would like to get the views of university teachers all over the world on this, that, or the other topic concerning universities as a whole, and communicate them to UNESCO. It is useful that UNESCO should know what is in the minds of the rank and file of university teachers all over the world.

We have in this country a membership of over two thousand, and in Belgium a body of five hundred, which has emerged during the last few months, and is very active, and the Swiss Association numbers eight hundred. We have commenced work by the discussion of a memorandum on student health, and another on the international functions of a university. We hope we shall have a group in France before long; and we are hoping that any post may bring news from the United States that they will co-operate. When we have the co-operation of the United States, France, Belgium, Switzerland, and the United Kingdom, our policy is to approach every university with a view to building up a federation of associations of university teachers all over the world. The effectiveness of such an international federation should be enormously increased by the existence of UNESCO, because it provides a market for our goods; so I am all out for UNESCO, and I hope all university teachers will do all they possibly can to help both it and the International Association.

I have a great respect for the report drawn up by the British Association's Committee under Dr. Maxwell Garnett. There is an interesting similarity between the findings of this and of the A.U.T. report; and that ought to give both groups confidence that they are representing a very considerable body of opinion in the country.

In regard to Professor Dobrée's remarks about civic universities, I owe and give allegiance to Oxford, and the traditions of the older universities; but I have spent most of my time in civic universities, and I always feel them to be the cutting-edge. They are more experimental and more alive in some ways, and have not a great weight of tradition behind them. Although I hope that Oxford and Cambridge as well as the modern universities will support UNESCO, I have perhaps more confidence in the civic universities in relation to the matter. It is a new idea: I think it can be captured more readily by them.

**Professor A. Photiadeos**

I WAS very much interested by what Professor Laurie has said, and there is no doubt that the International Association of University Professors and Lecturers is a very important thing to be established, because in this way it would be possible to help UNESCO in the domain of culture, which needs great encouragement at the present time. The only thing I would have been afraid of, from the point of view of UNESCO, is the possibility of having an association of university professors, an international association of professors and teachers of secondary schools—and even an association of teachers of primary schools—placing us in great trouble. That is why I think all this must be linked up with the national organisations which will be established in the various countries and member-states.

I think by establishing the proper scheme of the future UNESCO, it will be possible to link up all these international associations in the right way, without establishing a kind of priority for the higher education, leaving the others with their complaints. From this point of view I agree absolutely with Professor Laurie, but I also foresee dangers of a certain muddle if UNESCO does not provide this necessary scheme before beginning the different conferences between international bodies.

**Wing-Commander T. R. Cave-Browne-Cave, C.B.E.**

MAY I make a criticism and suggest a cure? It seems to me that a defect of university education, as far as I know it, is that the students of one faculty know very little of the work and the outlook of students of other faculties. I speak from experience at Southampton, which is largely a residential

university college ; but I think probably very much the same is true in other universities.

The defect is, I think, that the programme of each man's work is so full that he has very little opportunity for discussing his subject with men of other faculties. We cannot normally reduce the content of the syllabuses, because they are governed by far more cogent considerations ; but I think something might be done to encourage the students of one faculty to go and listen to the lectures and discussions at other faculties. It is not very easy to do, because faculties do not normally have lectures suitable for all purposes ; but I would like to see it made a definite obligation on the Professor of each subject to give one or two lectures on his subject for the explicit benefit of men in other faculties. I think this should be quite practicable and it does seem to me a most desirable way of achieving a better touch and understanding between individual faculties. Whether it can be done in that way I do not know, but it seems to me at the present time the touch between individual faculties is quite unsatisfactory.

On this last point, Professor Dobrée reported that such general lectures were being arranged in a small way at Leeds, Dr. Maxwell Garnett referred to an attempt some years ago in Manchester to initiate something similar and which met with poor response from the Senate of those days, and the Chairman referred to a happier experience in Oxford, where he had succeeded in interesting the Theological Faculty in international affairs.

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## Second Session : Afternoon

### (*a*) Extra-Mural Work of Universities

### (*b*) Universities and the Teaching Profession

### Chairman : Miss Lynda Grier

**Miss Lynda Grier**

International relations are the keynote of this gathering. We are here concerned in our conversations with UNESCO with the contributions which the universities can make to extra-mural work, and to the training of teachers by promoting exchanges, visits, summer schools, lectures, etc., from one country to another. Throughout we have to take for granted that the whole business is mutual. Only by that means can we prevent it from being an intolerable burden. Only by that means can we hope to serve any useful purpose.

There are those present who can tell of the actual overseas work of this country during the war years, largely to members of the Forces, and in other ways, and from them we hope to learn much that will be helpful in our discussions. And you can hardly meet any university teacher who has not been, or been urged to go, abroad to lecture in foreign countries, or to advise on who shall go, or to give time and energy to visitors from overseas. And when the sort of questions arise which are before us today there is apt to be the question raised by every individual member of the universities of ' What more is expected of us ? ' And indeed we cannot be surprised at the question, over-burdened as they are at this moment with more intra-mural pupils and more intra-mural work than ever before, requested to see what they can do in the way of increasing their accommodation by 50 or 100 per cent., and the younger universities implored to adopt the tutorial methods of the ancient ones and so either overwork their existing staffs—more than they are overworked already—or increase them from a population which has been too busy wielding the sword, or the bomb, to drive the pen.

Other staffs have been depleted by the Civil Service, although occasionally the universities get their own back, as in the case of Sir Robert Wood, who has been rescued from the Civil Service for academic spheres ; and Sir Philip Morris, who has been called from administrative work to university work ; but generally the trend has gone in the other direction.

That is one reason why it is so important from the first to insist on the mutual nature of the case. It is true that some countries are more backward than ours, and that we cannot look to them to give us exchanges which will be of real use. On the other hand, there are countries which are more forward than ours in certain educational matters. For instance the U.S.A. has, I believe, far more to contribute than we have in opportunities for educational research and perhaps—though I am more ignorant there—in the training of teachers. We are accustomed to receive from the U.S.A. more than we contribute in many other ways ; could we not do it in this also and therefore somewhat relieve the educational pressure on this country ?

But the problems are not only of personnel. The contributions of the universities of this country in that matter have been generous, almost lavish. It is also a question of initiative, of responsibility, of organisation. As things stand much of the work done by university teachers abroad is only known to their friends, possibly to their faculties, and only when it is a question of their going abroad for a considerable period will the university as a whole become aware of their activities. I believe that if the whole tale were told of what they do it would make a very impressive picture. But university responsibility tends to begin and end with giving or withholding ' leave of absence ' in certain cases. That of course is consistent with the freedom of the university teacher, a rightly cherished privilege. Yet some might be glad to be relieved in some way from the position of one popular university lecturer of whom it was said that he spent half his life in lecturing and the other half in refusing to lecture. That is not a form of freedom which many would covet.

On the side of initiative and responsibility comparatively little has been done. Largely because the universities have been so busy serving other organisations and responding to pleas for help, but also because they have not thought it their business. I hope this meeting is going to discuss how far it is their business to have initiative and take responsibility for organisation in those matters.

All universities have extra-mural departments, and there are signs that they are willing to undertake some of the work involved if the whole matter is not to be left to organisations outside the universities. These departments which came into existence first in Cambridge, then in Oxford, in London, and in Manchester, in the last thirty years of last century met with criticism which was strong and sometimes venomous. There was no limit to the ambitions of those who began the work. And like true pioneers they were always glad to have work taken off their hands by other bodies. Much of the stimulus for the creation of new universities and university colleges came from them. Michael Sadler, secretary of the Oxford University Extension Lectures committee, wrote in 1891 : ' it is possible that, before another generation has passed away, we shall see in a hundred English towns a foundation devoted to the higher education of its inhabitants . . .' More to the point of our meeting is the fact that in 1896, just half a century ago, Owen Seaman, later Editor of *Punch*, was sent by the Cambridge Board of Extra-Mural Studies to give a set of lectures at Nice and Mentone. How many other ventures of this kind there were I do not know. But there are today signs that various extra-mural departments are trying to extend their work beyond this country. The Oxford delegacy for extra-mural studies has formulated a scheme for University Extension Courses in West Africa. There is evidence of the need and the desire for such courses, and if carried through, perhaps with the assistance of UNESCO, they might pave the way for the founding of the West African University Colleges recommended by the Asquith and Elliott reports. Again from Cambridge I hear that the Board of Extra-mural Studies is sending two lecturers to Lausanne this summer, in pursuance of a plan which had been arranged for but had not matured in 1940. I have no doubt that other universities have similar schemes afoot. One of the questions that may well be discussed today is whether these extra-mural boards or delegacies are the right type of bodies to take the initiative in these affairs. My own belief is that they would do well to take some initiative and that financial aid should be forthcoming for them to do so. I have no desire to see them attempting to cover the whole field. But I think that it would be a great advantage if they were to cover some of it. Other bodies such as the British Council are most capably doing a good deal of this kind of work. But they could well be supplemented by some university organisation. And I believe that they would welcome and co-operate with it. Further it would put fresh life and enthusiasm into these extra-mural bodies, and it would, if it were to supply some sort of Employment Exchange for lecturers to and from other countries, bring the work of these departments into closer touch with other university departments. We are constantly being told that the universities neglect their extra-mural departments. That is largely because with growth they have become more or less self-sufficient, and because their work does not bring them into touch with any but their own lecturers. But that is a side issue, though it is not an unimportant one.

Of the training of teachers I can say little—particularly in view of the expert speaker who is to follow me—because my knowledge is limited so far as foreign connections are concerned. But I hope other speakers will enlarge on the possibilities of interchange. And the one thing we must all agree on is, that the extension of opportunities for teachers to get to know something of foreign countries, of foreign methods, of foreign research, both by foreign experience of their own and by meeting those from other countries who come to learn something of English methods, is likely to be of the greatest value to a profession which has been far too much

segregated from the rest of the world. We are on the brink of a great experimental period in English education, and only by wide vision can we expect those engaged in the experiment to make it succeed.

**Sir Robert Wood, K.B.E., C.B.**

YOUR Conference today divides over three sessions and, in effect, covers three aspects of the life and activity of a university. This morning, in considering the intra-mural work of the university, you have been concerned with what I might term the interior life. This afternoon you are examining the exterior life—the university in relation to the community in which it lives and works—while later you will be looking at the university in relation to the still wider world on the international plane.

At first I was a little surprised to find the question of the universities and the training of teachers—for I imagine it is training you have chiefly in mind—had been put into your second session as this seemed possibly to pre-judge the issue—put rather sharply in the Report of the McNair Committee—whether the universities should make it their business to embrace a definite responsibility as a university for the training of teachers generally, *i.e.* should admit the training of teachers to their interior life—or whether they should confine themselves to extending a benevolent hand of fellowship to an outside world of training in the development of which they might co-operate, but only as a partner along with other partners.

On reflection, however, I do not conceive that there was any such intention to prejudge that issue, more particularly as the report of your Committee on post-war University Education, published in 1944, would appear to favour a very close association of the training of teachers over a wide range with the universities.

I suppose it would be true to say that it is only in comparatively recent years that the need for—the essential value of—training for the teaching profession has come to be generally recognised. While the voluntary Training Colleges can, some of them, look back over a history of nearly a century, we know they were concerned, at least in earlier days, to give their students a minimum of further general education as well as to prepare them to instruct or teach. These places were at once places of higher education as well as professional training institutions. As our Secondary Education has developed the quality of the work of the training colleges has also risen and has made it possible to raise the standard of professional training.

But it is only over the last fifty odd years that universities have themselves developed their training Departments, giving a course chiefly, if not wholly, devoted to the science and art of education, and building on a basis of graduate attainment.

Some folk may be born teachers, but certainly not enough of them to fill the teaching profession, and while no training will create the perfect teacher—if such a person can exist, or does exist (or even ought to exist)—at least it is accepted—or pretty widely accepted—that there is a training in the technique of instruction and in the craft and philosophy of education—and education is much more than instruction—that can greatly improve the quality as practitioners—and as persons—of those who are to take up the teaching profession.

We now find the field of training occupied by a dual system—the training of the greater proportion of potential teachers conducted in institutions that are largely self-contained and tend to be intellectually isolated, and the training of a smaller proportion—who already have the advantages of having pursued a University Degree Course—in university institutions where they can continue to enjoy those wide contacts with other interests that are in themselves so vital a part of education. In 1938 the figures were roughly 10,000 students in the two-year Training Colleges and 5,000 in university institutions.

It is this preponderating isolation of the training of teachers that the McNair Committee sought to break down. It is of prime importance that the mischief of that isolation has had the floodlight turned upon it. Surely one of the weaknesses of our educational system, or our educational process, is that many, if not most, of those whose business it is to give young people a preparation for life have so limited an experience of life themselves.

It has been rather brutally said 'They have never been there.' That is no doubt going too far, but the fact remains that when every allowance has been made for personal interests, and social interests outside the school, for travel and wide reading—a very large number of teachers 'occupationally' have not had experience of being anything but student or teacher. All the more reason, therefore, that in their student days, or in their practising life, teachers should enjoy the widest contacts, to which the universities can clearly contribute, to lift them from the 'littleness' that tends to afflict the narrower professional life.

I would only add an aside just here : I am not wholly convinced that within the university sphere the Training Department is, or has always been, given the position and regard that it should enjoy. If the universities are going to give a lead in one way

or another to the development of teacher training and the life of teachers in their different regions, then it will certainly be essential that the Education Faculty should not be treated in any way as something of relatively small importance lying outside the main stream of university life and university activity.

Mr. Butler, when Minister of Education, invited the universites and university colleges to indicate, in the light of the McNair Committee's recommendations, to what extent they would be prepared to assume a responsibility for the training of teachers in co-operation with the Training Colleges and Local Education Authorities. In view of the rather diverse responses received it would hardly be fitting that I, who am still an official, should express any too definite a personal view on the choice or choices presented.

As you will know, the present Minister, Miss Wilkinson, has announced that she is prepared to accept some diversity of organisation and that she is anxious to see worked out in greater detail the several schemes that have been put forward by the universities.

It is not, perhaps, surprising that just as there was a difference of view on the McNair Committee itself, there is also a difference of view among the universities and university colleges—fairly evenly divided. Some have expressed their willingness to develop University Schools of Education which will bring within the purview of the Faculty of Education the whole of the training organisation within a given area. Others have not seen their way to go so far, but are fully willing to play their part in a co-operative area scheme, including in almost every case the establishment of an independent educational institute or centre which would serve as a focus—or I should prefer to say a hearth and home—for all those concerned with teaching, both students and staff, whether within the university, the Training College or on the staffs of Local Authorities, as well as contributing to the life and liveliness of acting teachers.

It is to this centre or institute, which is a feature common to either approach to the problem, that I myself would attach very special importance. It is one thing to create some new administrative machinery, whether as part of the constitution of the University or as a matter of regional co-ordination. It is quite another to kindle a spark of life and inspiration which may become a light to lighten the whole teaching profession and to influence the life of our schools throughout the wide and varied range of educational activities.

Even where the university adopts the plan of a university school, the physical centre or institute will be of first importance. It will be an intra-mural centre with extra-mural contacts. In other cases it will be the main medium through which in ways formal and informal the university will share its values with the institutions linked up with it in the area organisation.

High claims have been made, not always so much by the universities themselves as by others who feel keenly on this matter. It has been said, for example, that ' the universities should be the leaders and main sources of direction and inspiration of any truly national system of education.'

It may be argued that this is putting things very high—that there is a wide gulf fixed between the university and the primary school. Others would say ' Heaven forbid that the academic influence of the universities should permeate and ossify the free life and activity of the general body of schools. Surely there is some confusion of thought here. The influence of the universities should be exercised not by the determination of curricula and syllabuses but through the minds and outlooks of teachers—minds stimulated and outlooks broadened by association, even though in varying degree, with the intellectual life of the universities.

Apprehensions are growing—and the Chairman gave some expression to them—in some minds about the increasing demands being directed to the universities. We are to double the graduate output—extend extra-mural adult education—embrace new responsibilities in the field of teacher training! Can all this be done, it is asked, without so dissipating the strength of the universities, or so lowering their standards, as to jeopardise the real values of the education which it is their specific purpose to provide.

That is a question which will hardly admit of one general answer : certainly I shall not attempt to answer it. But this I will say, that in so far as it is desired that the universities should spread more widely through the community some philosophy of life, that sense of values and quality, that wisdom, which should be the outcome of learning, I can conceive of no way in which they can do so more expeditiously or with more effective economy, than by giving all that they can give of this to the teachers through whose hands in its early and formative years the whole community must pass.

I am very conscious I have reached the limit of my time, without having given any indication whatsoever of how I link what I have attempted to say with UNESCO, which is the motif of the whole conference. I found it an extremely difficult thing to do. I am almost quoting the letter of the late

Secretary of the British Association—he said he wanted us to consider how to help teachers to help their pupils to approach their studies from an international background.

I do not know that I am very enamoured of that thesis, if it means or implies any suggestion that there should be specific instruction designed to make children specifically internationally minded. Attitudes of mind are not induced by specific instruction of that kind, but are by-products of good education. And if you knew—I can say this quite bluntly—the terrible pressures exercised on the Central Department of Education from every quarter, by every good cause, by every crank (who is not always a good cause) who sees in the schools an obvious medium through which his or her propaganda can be spread, you would have sympathy with what I have just said. In other words, remember these children and young people have not got the international inhibitions which affect us. It is when we get older we find it extraordinarily difficult to believe that mankind may be our fellow-countrymen ; but children can interchange and have relations quite happily, and they do not have these difficulties on the international side ; but in so far as you widen the minds of teachers, the teachers in their turn will see that the atmosphere in which their children are living will be such as not to deflect them from this wider view, which may be essential to the salvation of mankind.

**Sir Philip Morris, C.B.E.**

WHEN I was asked to undertake this task this afternoon I realised that, in speaking after Sir Robert Wood, I should be desperately tempted to speak on the wrong subject, and to address myself to the problem of the training of teachers, and to a skilful exposition from the right side of the McNair Report ; and I find the temptation exceedingly great, having listened to him.

Not that I should disagree with him ; but I would enjoy saying a lot of things which I regret it is my business to keep silent about, things the McNair Committee reported on ; but when I was asked to take part in this conference with the main theme ' UNESCO,' I was placed in a very great difficulty, because you must first define what is your attitude to the United Nations, or any other organ of an international character which may be established. You have got to ask yourself whether you have got, so to speak, to abandon all your own principles, all your own gods, and seek a new temple in which you can bow down, and hope by doing so you will achieve a greater degree of understanding.

I rejected that point of view wholly ; and I therefore try to ask myself whether the one or two things I held to be most characteristic and important about adult education, before I had that most rigorous interlude serving the Army, were still valid, and whether I still believed them ; and what connection these had with the great and important move towards a greater degree of friendship between the nations on the one hand, and a greater capacity to work together between the nations on the other ; because strangely enough the second does not necessarily follow from the first. It is frequently the case that the most compact and united family, as far as mutual understanding is concerned, forms the worst team for actually getting something done ; so, in the time allowed, I propose to deal with what seem to me to be the two distinctive characteristics of adult education which are not only of fundamental importance to adult education itself, but, by being so, are also of fundamental importance to both mutual understanding between the nationals of different countries, and to co-operation between those countries.

In the first place, education at the adult stage is, and must be, wholly voluntary. By ' voluntary ' I imply something healthy and holy, rather than something aided and provided by the State. But in a realistic sense, if the adult does not take part in education of his own free will he does not take part in it at all ; and the consequence is that the student, in the case of adult education, is mature in mind and body and experience ; and as a result of his maturity has upon his shoulders the actual responsibilities and duties of a mature citizen. They are on him at the same time as he is concerned in studying the fundamental subjects which have a relevance to his actions as a responsibile citizen.

These seem to me to be the two absolutely distinctive characteristics of education in the adult field, and they seem to me to be a complete and adequate justification of the necessity for adult education to be self-governing. You may put it in one sentence, which is not always done on these learned occasions but which might be done more often with advantage. The teacher is in charge of the education of the child and of the adolescent ; and the adult, the student himself, is in charge in adult education.

The second line, and the one on which I want to develop these thoughts, is that adult education must concern itself with problems of the day ; and the relevance of the content of adult education to the responsibilities and vocations of the adult student is of the essence of its effectiveness. That is a highly controversial remark to make, but I will

leave the controversy to the discussion. It has been said that it should be 'part of the religion of every man to ensure that he is well governed' and it is no less a part of his responsibility to contribute both by word and deed to good social relationships.

There are many influences not primarily educational always at work in society offering attractions varying in the extent of their appeal, which together indirectly exercise a bigger educational influence upon adults than organised adult education can expect for some time to command. The cinema, the press and the political parties, published books and the theatre are sufficient examples. It is also the case that adult students are themselves actively taking part in a variety of ways in events and occasions of all kinds. They have their employment, their professional associations, their religious and social affiliations, all of which require them to make a distinctive contribution towards the life, morality and health of society. It is not, then, the increase in the number of scholars which is the first concern of adult education, but rather the interpretation of learning and scholarship to adults whose main life and business are not and cannot be academic or scholarly. These two characteristics of adult education constitute reasons why in my view the self-governing universities should be the essential core of adult education generally.

The universities are, some would say—and I should be one of them—first and foremost, a long-term experiment through the centuries in educational self-government. The continuance of this experiment is perhaps more vital in a more complex society and at a time when the deliberate ordering of social relationships in accordance with predetermined plans is, and because of the circumstances of the day must inevitably be, a foundation of policy in government. In such circumstances universities must remain self-governing and continue to be societies which allow fundamental disagreements to continue, not because compromise is humanly impossible, but because the interaction of widely differing views can be more fruitful. But they are more fruitful only when argument and discussion proceed, not in order that one view may prevail over another, but so that new concepts can emerge as a result of differing interpretations of the facts so far as they can be ascertained. The universities should, and I believe to a large extent do, provide such an environment and, in so doing, they go far to contribute to the advancement of learning and at the same time fulfil a function which is vital to human progress in a complex and largely regulated society.

But the advancement of learning is in the main the affair of scholars, and adult education cannot be concerned mainly with the training of scholars. The interpretation of the fruits of scholarship to those who, by their work and social relationships as well as by their educational activities, make society what it is, is equally vital. It seems to be essential that the advancement of learning should involve fragmentation, whereas it is surely the case that human progress requires integration and synthesis. The differentiation of knowledge into faculties and subjects, and of subjects into many particular aspects, particularly in the sciences, may easily come to be regarded as a division of knowledge itself. Also the mere development of particular terms of art, impolitely called jargons, without relation to the normal usages of language and literature, may itself exclude the majority of human beings from interesting themselves in the important activities of the few who are engaging themselves on the frontiers of knowledge.

At this stage in the world's history, international relations alone require that deliberate attention should be given to the synthesis of human knowledge and experience. A considerable proportion of our young men and women who are now coming out of the Forces have had experience of the peoples of Central Europe, the Middle East and the Far East, and as a result have found that there are living traditions and civilisations which have not contributed to and are obviously distinguishable from our own traditions. Whole peoples, amounting to the majority of the world's population, have for many of these young men become flesh and blood, whereas they were only names, and places and countries have become real, instead of being merely words on maps. Our horizons have been immensely widened by the rapidity of communications and peoples have been brought close together in time who are kept far apart by ignorance of each other's traditions and customs. These horizons will close in again with great rapidity unless awakened interest is nourished by scholarly knowledge, wisely interpreted. The United Nations Organisation must itself fail of its purpose if men and women, brought together by improvements in communications and associated together by an international organisation, remain divided by ignorance and superstition. We ourselves have a great tendency towards insularity and isolationism, which is of even more importance in matters of the mind than it is in the economic sphere.

The universities are, then, essential to adult education, but must they necessarily themselves engage in it outside their own walls? Clearly they must, because the interpretation

of knowledge requires not only learning, but also an intimate acquaintanceship with the environment, activities and habits of mind of ordinary men. Unless universities are themselves constantly employed in adult education outside their own walls they cannot discharge their vital duty to maintain the unity of knowledge and, being engaged only on their own devices, they must inevitably proceed more and more by fragmentation without the wholesome and useful discipline of synthesis. But the universities should not engage in the provision of facilities for adult education except to the extent that it is necessary to their own well-being unless there should arise from time to time particular activities which the universities can assist and which there is no other institution to provide for. Extra-mural departments need to be made more and more a part of the fabric of university life and organisation. A greater fluidity of staff is an important objective and a deliberate means of association between tutors wholly engaged in extra-mural work and the rest of the staff of the university should be devised.

So I would say the universities are for the good of the advancement of learning, as well as for the good of themselves as institutions and the society of which they are a part; and that they should concern themselves with the problems of ordinary men at the same time as they are trying more and more to solve the riddle of the universe and of man's nature.

**The Rt. Hon. Lord Nathan**

THE Army can claim to be one of the great pioneering educational forces in the country. Over a century ago, it was already making a sustained attack upon the illiteracy of the troops, which was then widespread. At the end of the 1914–18 war the Army Educational Corps was formed, and between the two wars the Army quietly and systematically set about raising the educational standard of its men at a time when adult education in the country could nowhere show a similar sustained effort on a comparable scale.

With the outbreak of the late war all organised education in the Army inevitably ceased. The Army Educational Corps was dispersed and employed on all kinds of other duties. In September, 1940, however, but not till then, the A.E.C. were recalled to their educational work and a scheme of voluntary education was launched, which took account of the needs of the new citizen Army. At this time the Central Advisory Council for Adult Education in H.M. Forces was formed to the work of which our universities contributed so much. This C.A.C., together with the Local Education Authorities, became the organ for providing all three Services with a magnificent volume of organised assistance from civil education.

In the winter of 1941, perhaps the blackest hour in the British Army's long history, education, surprisingly enough, instead of being crowded out, actually consolidated and extended its position as an essential part of Army life. The Army Bureau of Current Affairs was formed, and the Army, soon enthusiastic, accepted A.B.C.A. as its own. A little later, that remarkable experiment in elementary education in citizenship, embodied in the series of booklets 'British Way and Purpose,' was started and met with an equal success. Since then, until the end of the war, educational work expanded steadily throughout the armies at home and overseas. Illiteracy, of which substantial traces were still to be found, was dealt with systematically and successfully. A correspondence course scheme, started in December, 1940, instituted by the War Office, proved a godsend to thousands. During the invasion of the Continent, Army Education provided a daily news service for troops in the battle line. In the areas behind the battle, music, art, drama, languages and a host of other studies and activities were on foot, and it can justly be claimed that large numbers of men and women received through Army Education their first introduction to adult education as a living force. Throughout all this period the range and volume of assistance from civil educationists grew steadily, and became a large and integral part of Army Education.

But I must turn to the education scheme for the Army in the release period, which is at present an established feature of Army life. As early as 1942 the Army Council realised the important part which education should play in the release period. It was certain that the citizen soldier would expect an education scheme which helped him to solve his individual problems of resettlement. There was also the certainty that the Army during this period would be in a state of constant change and flux, as it steadily reduced in size; and there was the certainty that if the Army wanted education during this period of civil reconstruction, it would have to provide it for itself. It was decided to include at least six hours of education a week in normal working hours—education in the King's time—for every man and woman, wherever operational conditions made this possible. Two hours of this time were to be devoted to community education, using the well-tried methods of A.B.C.A. and B.W.P. The remaining time was to be given over to the education of the individual. A healthy and necessary balance was thus achieved between the claims of the community and of

the individual man and woman. The Army, when it is not actually fighting, spends most of its time in learning and teaching the arts of war. It was reasonable to expect that this tradition of learning and teaching could, if backed by adequate material resources and training, be turned to good educational account, especially when so much of the country's flower of skill and learning had found its way into the Forces. This expectation has proved richly justified.

An early and vital question which the Army had to face was what could be done to train the soldier for his job in civil life while he was still in the Service. Two things were clear : first, that the Army had neither the time nor the facilities to train men to the standard of skilled workmen in a variety of civilian trades, and secondly, that it would be a grave injustice to train a man for a job which, for all the Army knew, could not be found for him in civil life. This does not mean, of course, that the Army Education Scheme has nothing to offer a man which is of direct help to him in his post-war job. On the contrary there is a great deal which can be done and is being done. The curriculum in the scheme covers broadly the whole field of human knowledge. The titles of the six handbooks of teaching syllabuses prepared by the War Office indicate the wide range : ' Man and Society.' ' Home and Health.' ' Arts and Crafts.' ' Commerce.' ' Science ' and ' Technical Subjects.'

The whole curriculum is closely related to the practical realities of life and much of it is of direct vocational value. It offers not only the broad groundwork of knowledge required for a very wide range of civilian occupations, but at the same time an opportunity to men and women to follow their cultural interests in any direction they please.

At the present time, the Army is in a state of flux. The scheme which I have just outlined is primarily intended for the war-time Army as it demobilises. At the same time we are having to continue universal national service for the young man in order to meet our inescapable obligations throughout the world.

Ultimately the Army will attain its final post-war structure ; the educational plans for this are well advanced and are under close discussion by the civilian Army Education Advisory Board.

The plan provides broadly for the following types of education. Firstly, universal education, which we take to mean education in citizenship and current affairs on the basis of a sound modern education in English, History and Geography, Mathematics and Science. Secondly, voluntary individual education designed to satisfy the personal needs of the individual soldier. Thirdly, resettlement education for return to civil life, and finally education for the illiterates and semi-illiterates we get who must be brought up to the standards necessary for military efficiency.

Education will be organised at three levels. The elementary stage, the intermediate stage, providing for the bulk of Army personnel, and advanced education for further and more specialised studies.

In considering the future, the necessity for ensuring continuity of education is borne constantly in mind. The regular soldier requires progressive development leading up to resettlement training on release. The conscripts must be able to continue the studies which may have been interrupted by the period of service or to develop that education so far received with a view to entering a trade or profession or to undertake training for these at the conclusion of the tour of duty in the Army.

It is our intention to identify Army Education as closely as possible with civil education, thus continuing the work so admirably carried out through the agency of the Central Advisory Council for Education in H.M. Forces. Indeed this identification will be vital to the success of the work.

It is clear therefore that the Army must maintain close and continuous contacts with the main stream of education in the country. At the same time those responsible for the public educational system will, I hope, recognise a definite responsibility to the conscript during his compulsory service, and to the regular soldier throughout his engagement and be prepared to make available such civilian educational resources as the Army may be able to use.

The formation of the Army Education Advisory Board to which I have referred and the close liaison now existing between the War Office and the Ministry of Education are guarantees that the links which have already been forged with civil education will be maintained and strengthened. It is the intention to continue Army Education on the broad lines which have proved so successful during the war, so that the present serving conscript will be able to take his place again in civil life with the minimum of interruption to his studies by reason of his military service and so that the regular soldier will be able to settle down to a fruitful career in civil life strengthened and with outlook broadened by his years in the Army. Our object is to see that the soldier—both temporary and regular —has no less opportunity for educational purposes than he would have had if he had remained in civil life.

Much of the work which has had to be done

through education in the Army has only been possible because of the good-will and enthusiastic support of the universities and the teaching profession as a whole. The success of our plans for the future depends very largely upon the continued co-operation and positive assistance of the whole of civil education in general and upon the universities and teaching profession in particular.

It is our aim to ensure that the period of military service shall put a seal to the education of the serving man and woman. This service, coming as it does at a crucial period of life, offers opportunities unrivalled in the whole field of educational endeavour. We shall try to make the utmost of these opportunities, confident in your support, and convinced of the importance of this work to the nation.

**Mr. H. C. Shearman**

THE part which the universities have played in adult education in this country and in the Dominions has been something quite exceptional, if not unique, and it was surprising to find it treated rather incidentally in the section on Adult Education of the British Association's report on Post-war University Education. It is, perhaps, only when one comes to discuss these questions with workers in this field in Scandinavia, France or America that one realises the full significance of what the British universities have done.

Full credit should be given to the older universities which, while themselves, in the seventies, in the throes of internal reform, sent out teachers to the new industrial towns and, incidentally, sowed seeds from which more than one new university sprang. But University Extension has had its parallels elsewhere, notably in America. What is unique is the combination of a new teaching method—the tutorial class—specially adapted to the needs of the busy adult citizen, with a new method of securing co-operation between the self-governing teaching body and the self-governing student group. The 'Joint Committee,' with approximately equal representation from the university and the W.E.A., was, the late Archbishop of Canterbury used to insist, 'the key to the whole situation.' This was the way, probably the only way, to ensure that adult education was at once responsive to the conscious needs of those for whom it was provided, and that it was in intimate touch with the development of knowledge, research and criticism with which the universities are concerned.

In the new period, in which adult education is receiving much more attention in high places, it would, I think, now be agreed that the universities should extend their responsibilities, rather than hand them over to some new agency. In doing so, I would suggest, it is important that they should maintain that close co-operation with the organised student movement which has been of such importance for both sides.

Adult education has been apt to be regarded by administrators as a somewhat tangled intrusion into the pattern of an orderly educational system, largely because of the claim of the student organisation to equal partnership. Perhaps, too, some in the academic world may be inclined to look on it as not so much administratively as educationally untidy, because the students come to it with no formal training and often with strong personal or social motives. It is, indeed, tangled, because it is mixed up with life. Men and women take hold of different threads in their effort to work their way to the centre. Their approach is radically different from that of the internal university student, who completes his training before beginning to get experience of life; for they come with a considerable—sometimes, indeed, a painful—experience of life, to seek for knowledge that will help them to interpret it. Anyone who has had the privilege of being tutor to W.E.A. classes over a number of years must pay a tribute to the effort which many of his students have made in seeking to attain sureness of judgment and wholeness of vision.

The twofold influence of these tutorial classes is a matter of history. Thousands of men and women have been equipped, through their part in this movement, to play an active, an influential, often a responsible part in the various functions of a democratic society, while an untold number have helped to leaven the citizen body. On the other hand, hundreds of university teachers, particularly in the social sciences, have had their own studies enlivened by the comments and criticisms of their independent and sometimes unorthodox students—workers by hand and by brain—outside the walls of the university.

The partnership between the universities and the W.E.A., bringing together the academic tradition of intellectual responsibility and the democratic motive of social responsibility, has been significant out of all proportion to the numbers directly affected on either side, not only because of the partnership itself, but because the educational method has been exacting on both sides. The three years tutorial class, while it does not demand an academic entrance test, or, indeed, very high intellectual capacity in the student, requires perseverance with difficult problems which a short course by a skilled lecturer might have made to appear deceptively easy. Education can meet many

of the interests of men and women with little difficulty. To satisfy many forms of natural curiosity requires little effort. But when it comes to grappling with the perennial problems of social living—justice, order, liberty and peace—there are no easy answers, and the union of thought and experience can be fused only in a slow and persistent fire.

If this is true, as it has been proved in a generation of experience of adult education in England, it is surely most true of the efforts which men and women are making to find some sort of order in the confusion in which the international society of the future is struggling to birth. Here

> ' on a darkling plain,
> Swept with confused alarms of struggle and flight,
> Where ignorant armies clash by night,'

where our generation is groping its way towards a new dawn, UNESCO has, surely, a vital function ; for the United Nations cannot live unless it is born of mental and spiritual striving and not merely of diplomacy and planning. The particular solutions which may be found in the Security Council will fill the headlines, but they must inevitably be ephemeral ; history knows nothing of final solutions. What ultimately matters is the quality of the thinking that precedes and surrounds them : not only that of the statesman but that of those who make the opinion of nations, by which I do not mean the gentlemen of the press but serious minded men and women who are concerned to seek to understand these matters.

In the study of International Relations, as previously in the study of Economics, the adult education movement has had some influence on the universities themselves. When war broke out in 1914 these matters were little understood outside specialist circles. Without delay, tutors and students at the Oxford Tutorial Classes Summer School broke new ground in studying its causes, and an excellent book—*The War and Democracy* —resulted, our chairman of this morning (Sir Alfred Zimmern) being one of its editors. In the inter war years the subject received increasing attention, and as the number of classes grew rapidly ; we had, for example, a useful Conference of university extra-mural tutors at Chatham House on the problems of teaching in this field. In the most authoritative survey, the late S. H. Bailey's book on *International Studies in Modern Education* (prepared under the auspices of UNESCO'S predecessor, the Committee for Intellectual Co-operation), no less than one-fifth of its 300 pages are devoted to Adult Education. Noting that only in the British and Swedish W.E.A. and the Geneva summer schools was a ' synthetic ' approach to be found, Bailey points to two opposite dangers. On the one hand, in the universities, specialisation was gradually producing ' a darkness that threatens to become impenetrable.' On the other hand, ' there are few fields of study which lend themselves so easily to dilettantism ' and most efforts in education in this field, other than those mentioned, ' appear to have pandered to a fashionable curiosity rather than to have encouraged serious study.'

Universities must be concerned with serious study ; but they must not be so intent on specialisation that they cannot, in Bailey's words, ' help men and women with limited leisure to become, not specialists, but more effective citizens.' For our present purpose, that means to help them to discover how to blend their citizenship into the wider loyalties of a world society. May we not hope that one early result of UNESCO'S efforts will be the growth of new universities whose main function will be to explore afresh all these problems. The late Albert Thomas had a vision of a Workers' University at Geneva, to grow out of the I.L.O. Some tentative steps in that direction, indeed, were taken by the English and Scandinavian W.E.A.'s in the years before the war, with their Geneva trade union summer schools. I hope UNESCO will pursue the idea, in consultation with the I.L.O. There is a fine modern building, now tenantless, in Geneva, which might be used for such a purpose. Nor should our ambitions be limited to one such university. Can we not hope to see international universities, dedicated to research and adult education, in Geneva, in Russia (perhaps in the Crimea or the new Stalingrad), in China and in America, where the ceaseless coming and going of students from university extra-mural departments and adult education organisations will recall medieval Paris or Bologna ?

Let UNESCO think in bold terms and with far-sighted vision ; and above all, let it not neglect the mind of the ordinary citizen in all countries. Education must have a foremost place in the interest and activities of UNESCO. Science, of course, has a crucial place, for the common mastery of science is our most pressing problem. But the conquest of techniques by experts is, after all, only a means. The end is the raising of the level of intelligent co-operation throughout the world. To reach that goal an altogether new level of general education must be attained ; and education must not end with youth ; it must be carried on in the light of experience of life, constantly blending with fresh thought and new knowledge.

## Discussion

### Dr. A. Kihlbom

Listening to the discussion this morning and the addresses we have just heard, I have been impressed by the difference between the British idea of education and the more narrow, more limited, and more completely intellectual idea of university education that we have in Scandinavia and in many places on the Continent.

It seems to me that you take for granted that universities are *the* places of education. The statutes of the Swedish universities lay down that the universities exist for scientific and scholarly research and instruction. In Sweden we have very little University Extension work. We have our W.E.A and the People's High Schools doing excellent work, but we have very little, or practically nothing, of University Extension work as such ; and it seems to me this is due to the narrow and limited idea of the function of our universities. In Great Britain you look to the universities not only to train the mind, but to build up the personality of your students, and this gives to your ideas of the function of a university a wider horizon. Here is a point where I feel that when, as I hope, we shall ultimately have the honour to belong to UNESCO, we shall profit enormously from this interchange of ideas that every country takes for granted, and hence never makes clear to the outside world. That would be to my mind one of the great functions of UNESCO, and I am sure that in time we shall have to widen our ideas of the functions of the university, and to realise that we must build up a connection between adult education and between the universities in our countries. To sum up my impressions of what I have heard at this meeting today ; it is that I feel a more fervid hope than I felt this morning that Sweden will in the near future be allowed to join UNESCO.

### Dr. Esther Brunauer

I am an American representative of the Preparatory Commission and I feel quite at home here, because in the United States for some months now there have been meetings everywhere throughout the country of groups like this. Your opposite number in the United States, the American Association for the Advancement of Science, and organisations representing every aspect of UNESCO's programme, have held frequent meetings, and have been discussing the relationship of their own interests in the United States to the programme of UNESCO.

It is, of course, the very life-blood of the organisation that groups of people in every country who are concerned with education and science and general culture should be personally participating in thinking and working on programmes for this great international organisation.

I am going to take this occasion to let you know, and you will be the first group outside the United States to have the announcement, that our Congress has finally finished action on legislation to make the United States a member of UNESCO. Since you, the United Kingdom, were the first to accept the Constitution, we honour you for that ; but we have still a good many steps to go through ; but in course of time, as soon as it is possible to have proper instructions here, we too will sign the Constitution, and it will not be very long before the necessary number of governments will sign, and the Constitution will be in operation and the organisation will go ahead.

Mrs. Martin Clarke and Miss L. E. Higson also contributed to the discussion.

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## Third Session : Evening

## International Relations of Universities

### Chairman : Professor Jean Timmermans

### Professor Jean Timmermans

Dr. Huxley being unfortunately unable to attend this meeting, I have been kindly asked to take the chair in his place at this session. I can only imagine that I have been so honoured because of the work I was able to do on the Committee on Post-War University Education, established by the British Association during the war, under the able direction of Dr. Maxwell Garnett.

During these fateful years we were busy, British and refugee scientists together, examining the problem of the rehabilitation of research and teaching in the occupied countries of Europe and Asia. We prepared many schemes, later embodied in the work of the Conference of the Ministers of Education convened in London by the Rt. Hon. Mr. Butler, from the end of 1942 onwards and from which UNESCO is now blossoming. For this reason the Universities of continental Europe owe a great deal to the British Association as well as to the Association of University Professors and Lecturers of allied

countries in Great Britain, which started in London in the beginning of 1942, and is now becoming an International Association. Such an Association is the first of its kind in the story of the world and results from the development of the social conscience of the teachers in all countries during the war. If I may say so, we university professors, although sometimes white-haired, are only coming of age now, as a group which, in spite of the very strong individualism of its members, is realising more and more its responsibilities in the reshaping of the world. May I add some further remarks about the very important part this international association will be able to play.

As representatives of research, the university professors find their place alongside other research workers, in the numerous scientific bodies which are gathering once more, for the first time since 1939, this week in London in the International Council of Scientific Unions. By necessity science is international even if scientists may be grouped in national schools of thought.

As teachers, university professors had formed, before the war, many national associations, but there was no permanent link between them. It is obvious that many problems require the attention of university teachers, problems which can only be solved by international collaboration. Some will require the collaboration of university teachers and their colleagues in schools, and as for others it may be necessary for university teachers to work together with the administrative staffs of each country. There are, for example, equivalence of diplomas, exchange of students and of teachers, and so on, where a permanent adjustment is necessary between different countries, and where we who are university teachers may help a great deal.

But there is more. University professors must accept their responsibilities not only towards their students, but also towards society in general ; not so much in fostering the moral and material status of both scholars and scientists—this can only be conceived as the natural reward of services rendered to the community—but to direct public opinion on the many problems where learning is able to bring some useful data to bear on the shaping of the future.

In this troubled world of today frequent personal contacts between university teachers of all countries are indispensable to dispel the haze of preconceived errors and misunderstandings between nations. Indeed, one of the greatest difficulties of our time is, not that we may be short of men ready to make the greatest sacrifices for their ideals, but the danger of false gods for whom so many, and especially the young who are too ready to become fanatics in good faith, are prepared to give and take life for ideals that are not worth so much. By our international contacts may we be able to reach a better understanding and to explain to others the ideals of each other, and so to work for the peace of the world.

I should like to read to you the last sentences of a resolution which was adopted the day before yesterday by a very representative meeting of men of science of Europe and America, the International Council of Scientific Unions, meeting in London. They resolved : (1) to maintain a spirit of frankness, honesty and co-operation and to work for international understanding ; (2) to promote the development of science in the way most beneficial to mankind and exert their influence to prevent its misuse ; and (3) to serve the community not only by specialised work but by assisting so far as they were able in the education of the public in the purpose and achievements of science.

**Dr. Howard E. Wilson**

It is a privilege for me to bring you the greetings of the Preparatory Commission of UNESCO. UNESCO appreciates the arrangement of this meeting today by the British Association, and we recognise the fact that the Association and UNESCO have a great many interests in common. We are alike pledged to believe in the advance of the arts and science, not only as being valuable in themselves, but as service agents for the improvement of mankind. We are alike in believing that this advance is an essential requisite for all humanity and not only for the small group called ' intellectual.' We hope that the co-operation which begins here today between your Association and UNESCO will continue in the future.

At the first Session this morning Sir Alfred Zimmern described something of the structure and nature of UNESCO. I need only say that UNESCO is an inter-governmental organisation coming into existence as a result of a constitution adopted by most of the United Nations last autumn and now in the process of being ratified. Pending the time when it becomes a permanent organisation—perhaps in November, 1946—a Preparatory Commission is at work and a Secretariat is trying to formulate a programme of action in the field of education, science and culture at the international level. That Commission has held a series of meetings. At one of these meetings it considered, for ten days, a programme of action which had been formulated and prepared by the Secretariat. We hope to have that report in a definite form by the middle of August. After final approval by the

Executive Committee it will be sent to the Governments for study between that date and November 5th, at which time the first General Conference will take place in Paris. The report will be the basis for discussion at the November conference.

In the programme of UNESCO, as it is at present envisaged, there is much to concern people who deal with universities or with other institutions which deal with education, science and cultural matters. I suppose that UNESCO itself, a relatively new phenomenon, is an indication of the world-wide attempt to adjust institutions to the fact of one world. I do not mean the fact of one world in a political sense but in economic and sociological matters. UNESCO is an attempt at political adjustment to the fact of one world. Universities also are part of this adjustment. Universities, although they have for long been international institutions in the sense that they deal with arts, science and culture above the national level, are faced today with the same basic problems of readjusting or reorientating themselves as are political institutions, economic institutions and most national organisations. It is because of this necessity for readjustment and reorientation in university life that this meeting has been called today. We are all searching for the best means by which we can make these centres of learning more adequate focal points for the advancement of art and science and for the instruction of young people who must deal with this one world.

I should like to suggest five ways, each of them very briefly, in which I think university institutions may adjust themselves to this situation. There is nothing particularly new in them. Every institution is to a greater or lesser degree already carrying on this adjustment, but I want to mention these five ways and then illustrate how UNESCO might be able to serve the universities in each of the five methods of adjustment.

In the first place, all of us who are concerned with instruction in universities must, I think, recognise the fact that to a greater extent than before university curricula must provide opportunities for the young people in universities to study cultures other than their own. I know that to a certain extent we have done this, but it has not been done adequately in very many institutions. As a citizen of the United States I can welcome wholeheartedly the relatively recent development of American studies in British universities. I do not mean to imply that the United States has always been ignored in British universities, or that British and American cultures are very different. But they do differ and the rise in recent years of study which will enable British students to understand better the United States is a good sign. In the United States in recent years there has been a marked rise in the study of Oriental cultures and Latin American cultures. We are impressed with the great rise in these regional studies as fields of specialisation on the part of young people in colleges and universities. But more than that, they are included in the general framework of studies of the liberal arts student before he reaches a specialist level.

These two illustrations, that of American studies in British universities and that of Oriental studies in American universities, are indicative of what is happening over the whole world. There is a new consciousness of other cultures. How can UNESCO be of service in helping to promote these studies within the university curriculum? In the first place, I think that UNESCO will in all likelihood undertake studies of these phenomena and make studies of the extent to which regional specialisation is appropriate for universities. It will also make studies of cultures or will facilitate the study of them by private organisations and institutions and individual scholars. In a sense then UNESCO will study these phenomena and bring to the attention of the university world the most promising and successful practice in this field which can be discovered.

In another way I think that UNESCO may be able to aid this movement at a high level. One of the reasons why Asiatic study has not been widely developed in the Western World is that so much of the basic material remains untranslated. Most of us in the Western World know very little about Arabic or Chinese classics and so on. I think it can be said that UNESCO visualises a far-flung translation service by which documents of philosophy or documents of a literary character may be translated and thereby be made available for pupils studying cultures other than their own.

In the second place, it is not enough for the university curriculum to be readjusted so as to provide for more adequate study by students of cultures other than their own. In a sense there must be stressed, and heavily stressed, the international ramifications of every discipline now in the curriculum. The natural sciences have led the way in universality so that they provide an easy approach for the scientific reaching out from one culture to another. The international aspects of science are inherent in the subjects themselves. But other aspects of the curriculum have tended to be relatively regional, national or provincial. There has not been an adequate reaching out on the part of sociologists. I know that in my own country if a student studies programmes of social legislation he does so as they are carried out in the

United States or Britain, and, until quite recently, he had no knowledge of programmes of legislation in Asia or Latin America. In the same way literature in American universities tends to be provincial. It needs to be broadened. The various subjects which we are already teaching must be internationalised within themselves if they are to do justice to themselves or if they are to do justice to the students who study them.

In what ways can UNESCO perhaps facilitate the development of international connections and ramifications for each discipline? There are various ways. It may be perhaps that UNESCO will be a bibliographical centre by which the developments in any discipline, whether natural science, social science, or the fine arts will be called to the attention of the leaders of that discipline throughout the world. That could be done by abstracting services, by bibliographical means, by digests, by books, journals and publications of various kinds. UNESCO's function is to make certain that each of these disciplines is adequately dealt with on its new world-wide scale. I think that UNESCO is certain to reduce the relative provincialness of the disciplines. I think that UNESCO can serve in centralising these disciplines by helping to provide contacts among the professors of these disciplines. We seek an opportunity of co-operating with any professional group of any character. In some fields where international associations do not exist we shall take the initiative of creating such associations and will co-operate with them on a basis of their complete autonomy. It would be fatal if such associations were dominated by an international inter-Governmental organisation. We do not want that, but we will work, with them and I think we shall be in a position to provide help for them in the way of arranging international meetings, facilitating exchange of personnel and sometimes providing a secretariat for international voluntary associations, providing public information services and occasionally providing grants-in-aid to particular organisations to do particular tasks which fall within the common range of UNESCO and themselves. By those means I think that we can establish, on a stronger basis, the international ties which actually exist within each of the established disciplines.

The third thing which I think should be encouraged is for a larger proportion of students in universities to study directly the techniques of international action. It is, for example, too common in historical instruction to discuss in detail the results of a peace treaty without giving attention to the techniques by which it was produced. The way in which nations conduct their business is a matter of direct concern to anyone in the world of today and tomorrow. There needs to be increased prestige and attention given to the study of international law, not for the specialised students but for the reasonably intelligent citizen. The techniques of international law, arbitration and compromise and international meetings—these are all proper subjects of study. It even appears that there may be some further development within this field and we think that UNESCO can again help by the preparation and publication of material and by calling attention to aspects of the international situation through organisations, conferences and meetings.

The fourth matter I would emphasise is the increased interchange of students and faculties. It is doubtful whether UNESCO will, in the immediate future, be in a position to finance these interchanges, but it will be in a position to facilitate them. It may do so by making provisions for travel. It will, I think, facilitate interchange by being a clearing house for the interchange of personnel or for information about interchanges. It is to be hoped that UNESCO can be an advisory group whose advice is sought by institutions which have scholarships to grant. Within the Secretariat of UNESCO there will be a group of people who will keep track of individuals who ought to be resident in other sections of the world for a time or who have opportunities for studying in areas where there is a possibility of specialisation in their own field.

This interchange of students will go on regardless of what UNESCO does. It is already going on under the auspices of Governments and private institutions, but UNESCO may become a co-ordinating agency in this field.

Lastly, I would emphasise the point that the university itself as an entity and a cultural institution must have a wider range of contacts than it has had in the past. The extent to which a university develops for itself a network of human relations circling the globe and the extent to which some of its researches are collated in foreign areas, and foreign students welcomed, are part of this continuous movement. It enters also into the administrative aspects of university life. The university, as an administrative unit, must come into closer contact with other administrative units throughout the globe in order that interchange may be facilitated. In UNESCO we are constantly bombarded by suggestions from many quarters for the establishment of a world university. No suggestion has come to us with greater frequency than that we should take steps to

establish such a university. Many people suggest the exact place and some indicate the budget which would be necessary for sustaining it, and some even apply for positions on the faculty.

It is unfortunate, I think, that we have allowed the opinion to become prevalent that any one of our institutions is less than a world university. What we need is to work in all the ways I have described, and in all other ways which can be devised, to make each university a world centre of learning in which its own students may reach out to an understanding of and respect for the variety of cultures and plans, hopes, fears and problems which exist throughout one world.

**Dr. G. B. Jeffery, F.R.S.**

A MODERN printing press is a vast machine, yet the actual printing is done in one line of almost mathematical breadth in which the type meets the paper. The vast complexity is designed and exists for the purpose of bringing the type and the paper into contact at the right time and in the right circumstances.

A university is a vast administrative machine with its Statutes, Charter, Senates and innumerable committees. Its work is actually done at the point at which two minds meet. One may be the mind of a scholar reading in a library and the other that of an author long dead ; one may be the mind of a teacher and the other that of a student, perhaps in the teacher's study, perhaps in a crowded lecture room. All the elaboration and paraphernalia of administrative offices, buildings, equipment, libraries and laboratories is justified solely by the frequency with which it brings two minds into fruitful contact.

An international university is one in which the mind contacts it promotes are not limited by nationality. If any university includes foreigners among its students and teachers, or promotes the study of the work of foreign authors and scholars, it is to that extent international. The difficulty of conceiving any university that abstained from doing these things shows how essential internationality is to our conception of a university.

The reason is not far to seek. Our minds find a great stimulus to their growth in contacts with other minds. The more diverse these contacts are the greater the stimulus and the more balanced their growth. Any limitation of contacts to minds of one general type brings its corresponding dangers of lopsided growth. The particular limitations based on modern notions of nationalism have their obvious and special dangers.

Every university that we can recognise as such is therefore to some extent international and our criticism must take the form that they are not international enough, or that they are too national in their conception of their work.

Let us avoid extremes. Every university is necessarily national, at least in the sense that it grows out of the effort, and is intimately related to the culture and social structure, of the community in which it is set. To deny this is to cut the universities off from their roots in society without which they cannot live. A university must be national, and it must be international.

UNESCO has been born because of our common sense of national isolation on the cultural level, and there is no need to pile up the evidence. There are English scientists who know the work of American scientists in their field as well as they know the work of their compatriots, but how much more frequently the story is a very different one. There is a great deal to be done in developing the international character of our universities.

Something can be done by the promotion of a wider range of studies, less limited by national considerations. One example already mentioned by Dr. Howard Wilson is the development of regional studies. The language, literature, history, culture and social structure of a foreign country are studied in a co-ordinated school within a university. In this way it is possible to establish a much closer contact with the thought of a foreign people than that which usually results from the traditional concentration on language and literature. There are parallel opportunities in the higher fields of research. It is not merely a question of the specialist knowing the work that is being done in his speciality abroad. There have been too many national specialisations within specialities. One particular aspect of a field is actively explored in one country and neglected in others, and related but different fields are kept apart when with advantage they could be brought together. Hence the great importance of international conference covering a reasonably wide field.

These measures for the internationalisation of universities should be explored and promoted in every possible way, but they are largely concerned with the indirect contact of minds through the medium of the printed word. Other things being equal the contact between minds is most effective when two persons meet face to face. Hence the prime need is for the physical presence of foreign students and teachers in a university and the corresponding opportunity for students and teachers to work for a time in foreign universities. Everybody agrees that this would be

good and there remain the practical problems of ways and means.

Financial provision is clearly necessary. There are also problems of living accommodation which are not simple. By providing no accommodation, or the wrong kind of accommodation, we can hinder the visitor from making proper contact with the members of the university or from making those wider contacts he ought to make.

There is a special problem relating to the exchange of students with which I believe there is some prospect that UNESCO may help. The arrangements for the reception of a foreign student usually have to be made on consideration of his paper qualifications. Often this presents great difficulties. Universities differ widely in the arrangement of their courses and in degree of previous knowledge they require. We need precise information as to the standing of a student in his own university and as to how that standing can be interpreted in relation to the receiving university in order to decide what kind of course the visiting student can pursue with profit. It is hoped that information of this sort may be more freely available.

When it is available, it should not be used as a basis for captious criticism and pointless rivalries about standards. When we are able to decide the nature of the course that a foreign student can profitably undertake and that he has a sufficient command of the language of the university in which he is to study, the formalities should be dealt with on a broad and simple basis. Within a wide circle of universities of established repute, one qualified to become an undergraduate in his home university should be received with undergraduate status in any university, a graduate of any university should be received as an advanced student and accorded graduate status by any other university. That seems to be an attainable ideal, but we have a good deal to do to promote such a state of affairs within this country before we can extend it abroad. We should lose no time about it, for there is some evidence that this country is lagging behind in the promotion of such interchange facilities on the international plane.

In these days when so many international organisations are being set up, it would be easy for us to call for an international university, with its site, buildings, professors and administrators—a place where students and scholars from all the universities of the world could meet. It would present a marvellous opportunity for organisation, but a university does not consist in organisation. That is not the kind of international university in which I would put my faith. I would prefer to see each university firmly rooted in the culture of its own people, yet international in its outlook and in its function; realising that the things for which it strives transcend all differences of race, language, or custom; conscious of its responsibility and its part in an invisible university of the whole world and of all time.

Who can gauge the power and the possibilities of such a world university? Its members moving within it would find new inspiration and wider experience. The impingement of ideas upon ideas would beget new ideas, and the expansion of knowledge would be greatly accelerated. Thus the prime purpose of every university would be better served.

But that is not all. Other opportunities would open out. The vigorous and strong universities would find opportunities to strengthen and assist those that are not yet so strong. The realisation of a common purpose would ensure that this was done, not in an offensive spirit of patronage, but in co-operation and fellowship.

Have we not all noticed in our personal international contacts how much easier it is to speak openly and freely on matters of education, science, and scholarship than it is on matters that more readily evoke national prides and prejudices? You do not lose face in these things by admitting that you have not been able to accomplish all you hoped. An international university would be the flux for every other kind of international relationship. If ever our universities came under the control of Government we would lose so much of this opportunity, and that, perhaps, is the final reason why we should be vigilant to safeguard the independence of our universities.

There is no reason why we should not take a cheerful view of the task in front of us. It is not going to be accomplished fully in a year or in fifty years, but we are not too badly placed to begin and the opportunities for fairly rapid progress are many.

The right place to begin to develop most objectives is the place in which you are. What of our individual colleges and universities? Have they a due proportion of foreign students? Are they coming from a sufficiently wide range of different countries? Are there important omissions? If the answers to these questions are not what we would wish, is there anything practical we can do about it? Are our own students going out to universities abroad as frequently as we would wish and, if not, what is stopping them? What about our own individual academic interests? Do we know the centres abroad in which similar interests are being pursued actively and successfully? Have we done all in our power to make contact with them either by managing to get

there ourselves for a time or by attracting visitors from them? What about the great universities that are little more than names to us? Have we made any serious efforts to break through to them? Those are some of the practical questions which I suggest that you might consider in your discussion.

## Discussion

### Professor Jean Timmermans

I might perhaps open the discussion myself. There are so many suggestions contained in these two papers that it is very difficult to make a choice. On the question of education I will suggest a very interesting method for international studies and that is a comparison between the methods of education of the different countries. To those of us who came from the Continent during the war it was striking to see the difference there is between British education and Continental education. This difference may be summed up by saying that on the Continent we are most interested in learning a great deal, but in England you concentrate on making real men and citizens and you are more interested in bringing out the character of a person than in making him into a scholar. That was the great lesson which was taught to refugees who came to England. We have come to understand what may be the influence of this type of education on the formation of the whole mind. We are inclined to fix our attention too much on learning only and not on building up strength of character. Therefore, I think it would be very interesting to make a comparative study of the respective merits of English and Continental education.

### Professor E. R. Dodds

Dr. Wilson put before us in an exceptionally clear manner a concrete statement of the problems with which we have to deal. In connection with the question of area or regional studies, I was given the opportunity last year of looking at what was being done in the United States in the field of regional studies of the Far East, and I was enormously impressed not only by the practical treatment but by the future possibilities of the idea. The idea was to give certain young people an all-round picture of contemporary culture and not simply what we have traditionally given in this country, namely, a knowledge of the language and literature. I feel that the difference between languages and the problems of international practice is very unfortunate and we should make an effort to overcome it. I think actually that we have a good model for that kind of thing at Oxford, which is and always has been a kind of regional or area study of Mediterranean culture. I should like to see other modern language schools developed on those lines and I hope that UNESCO will bring that point to the attention of our universities.

### Professor L. Dudley Stamp, C.B.E.

May I make a few observations, partly on the ground that I have had some experience as a member of the staff of an institution which is close to an international university, the London School of Economics? The main difficulty there as a rule is to reserve enough places for English students and not to give them all to the foreign students who are so anxious to come to us. In that way we are brought face to face with the problems of an international university. I think that in this country we do badly need to put our own house in order as far as universities are concerned. The first great difficulty is a certain rigidity in our courses in this country, in that the greater number of our students who go to universities go there in order to get a certain training which will enable them to earn their living. The result of that is, I am afraid, the pre-eminence in this country of the final examination which does result in a rigidity of teaching. As a result of that there is a fixed syllabus with an examination, and therefore we find great difficulty in fitting in those who wish to come for general educational reasons and also in fitting in those whom we should like to have from other universities to join our teaching staff. They have to fit into an exacting syllabus.

I suggest that we must get a greater fluidity throughout our courses in this country, even if it means putting aside one-sixth of our time and encouraging our new students to attend courses of general educational value. We could then, in that spare time, give lecture courses to visitors from overseas whom we are so anxious to receive.

The difficulty of receiving foreign students and staff in this country is not only fitting them into a scheme; we have not here the tremendous advantage, which I found in the United States for students and staff, of international hostels and faculty clubs. I have been trying to arrange a comprehensive three months' course in this country for a young man from Switzerland. We have been faced with the difficulty of having to pass him from individual to individual. What we ought to have attached to each university are recognised hostel arrangements. That should be automatic, and it should not require the immense amount of organisation which it does at present. I am aware that in the older universities it is perhaps simpler but it is a real difficulty which must be faced. It is for such a body as UNESCO to tell us

from the international angle what is needed on our side, and we must adopt a receptive attitude towards the changing of our existing system.

On an entirely different matter I go so far as to say that among the rank and file of people of this country there is a tremendous ignorance of the world as a whole, and particularly of most countries of the world, and that the voters of this country make up their minds on political matters on the flimsiest of hearsay evidence. I therefore appeal very strongly for the development of regional studies, so that our people can acquire an intelligent and balanced knowledge of other parts of the world.

I suggest that a great deal of the progress made in recent years has been in natural science in the study of ecological relationships. We know the importance of the plant and its environment, and the importance of the animal and its environment; and similarly I think we should make an ecological approach to the study of man—which is essentially modern geography.

**Professor R. D. Laurie**

I HAVE listened with great interest to the speeches made from the platform. I would associate myself with the conception of an international university which has been put forward by Dr. Wilson. The same idea has been put forward by Dr. Jeffery, namely, that every university should be international in its outlook. How are we going to get this brought about? Something may be done by introducing various courses into the universities, but the main consideration is the ordinary university teacher—the rank and file of university teachers—they should have that international outlook which would make a university international. This is doubtless a far cry. I hope that the newly formed International Association of University Professors and Lecturers will be able to help. (See remarks in the First Session, p. 47.)

**Professor B. C. Guha**

I AGREE with Dr. Wilson that every university should aim at developing an international outlook. As a matter of fact, the British university students have universality. Unfortunately they follow a very national pattern in almost every country, but I do feel that in courses of ordinary instruction, which are usually given to the student in order to train him for earning a living, it is difficult to maintain that spirit of international outlook all through. It is difficult to find the time in which to do it. It seems to me that we should attempt to have at least a few international universities in different regions of the world.

But, after all, even if people attempted to imbue an international outlook in an international university, it would probably not be the main outlook. I have seen one truly international university at Tregore. One could enter that university and imbibe the international atmosphere there. It makes you feel international. I doubt whether it would be possible to bring about that atmosphere always in a national university. I imagine that a relationship could be established between a national university and an international one by people from the national university going to the international one for some time, in order to spread the atmosphere. The two should not be mutually exclusive. In that way I think we could get the international atmosphere in the course of time.

**Professor T. H. Searls**

I SHOULD like to refer to the third of Dr. Wilson's points—the need for wider study of the techniques of international action. I was for some time in a university in the provinces, and while I agree that there is this ignorance of other countries of the world, there is at the same time amongst the mass of the people a colossal desire for information about international affairs and other countries, and a desire for university extra-mural teaching. I found it quite impossible to get the teachers. In a sense the university had not quite caught up with us, and failed us in a way. The number of teachers of international affairs in our universities in this country is limited to two or three. Although, of course, we found that we could get great help from geographers, historians and economists, we found that the courses on international affairs taken by the university teachers were so biassed in the direction of their own subject, that it was difficult to get a balanced view of the problem as a whole.

I would plead strongly for the establishment of more chairs. That will be difficult until we get one or two steps taken. I would press that very strongly on Dr. Jeffery, and the University of London in particular, because it has great influence in relation to examinations taken by university colleges in the provinces. I would urge London University to include the subject of international relations as a possible subject in ordinary courses. I realise that that may require some working out, but if the subject of international relations could be taken as an ordinary cultural subject by the ordinary student training for a job, it would be more widely studied, and in the course of time the teachers would become available.

The ordinary university student who is going to become a secondary schoolmaster should be able to take that particular sub-

ject as part of his ordinary training. If that could be done I am sure that the demand for the subject would be very considerable, and the universities would have to expand by establishing more chairs and getting more teachers.

**Dr. G. Ungar**

I SHOULD like, if I may, to mention an international university which I outlined some time ago at a meeting of university professors. It seems at first sight that an international university could be realised in two opposite ways. Firstly, we could set up an entirely new university somewhere, with all its departments and teaching staff, and then recruit students. That seems entirely impracticable. The other way is by means of an invisible university, which was mentioned by Dr. Jeffery.

In this plan I put forward an intermediate solution. You all agree, I think, that a university should be international ; but it is not as a rule. What is needed is some kind of a framework for internationalising universities. What could be done would be to compile a list of institutions in various countries of the world which have an international prestige, but which exist also for social science and history. With a certain number of those institutions we could have an invisible international university with a governing body which should be temporarily composed of Nobel Prize winners and so on, and those institutions should have the task of accepting a definite number of foreign students. They could only be graduate students at first, but they would be the future teachers of the new generation and would spread the international spirit.

Various objections have been raised to this plan, mostly of a financial nature ; but I think that if this plan were a suitable one UNESCO might be able to arrange the financial side. There are, of course, other difficulties, such as how to select the students, and the difficulty of language, but for the time being there are two or three languages which could be university languages. In this way we should get an invisible international university at the beginning, but later on it could spread ; and I think there might ultimately be a need for some kind of central institution.

**Mrs. Martin Clarke**

IT seems clear that scientists are very important people today from the point of view of the welfare of the whole world, and yet I suggest that the real problems of today are not so much concerned with the natural world and the technical world as with the complex of relationship between human beings. Our real problem today is that of the relationship between human beings and social activities generally, and the universities should concern themselves with that problem.

In that field there is a terrific potential contribution from the research side of the universities. I do not feel that we need to apologise for the arts, and I feel very strongly that the best minds of the United Nations should be concentrating just as much on these, because they are as much needed for the welfare of mankind as the scientific subjects.

**Miss Vera Foote**

I AM a lecturer on the West Coast of Africa, and I have rather long leaves, and come home for three or four months. During that time I sometimes desire to do something in the way of courses, but it usually takes me the whole of my leave to find out where such courses are available. If you go to a university, or to some other place, and ask for information on a specialised subject, it is almost impossible to get it. I feel that UNESCO should have some place where information about all kinds of different courses in different subjects is available, so that people from abroad could get into contact quickly with what they are interested in. There is a great deal of interest in various subjects, but it is difficult for the ordinary person to get really first-hand information about anything.

**Dr. Howard E. Wilson**

IT would be rather an impossible task for UNESCO to provide information for everyone, but UNESCO has relations with each nation through the co-operating bodies. In the United States there is being established for the first time a co-operating body of about a hundred people, who represent the sciences, the arts, cultural education and so on. That will have a secretariat of its own, and will carry on many of UNESCO's functions within the nation. Bodies of that kind are being created in Britain, and I should think one could turn to the national commission or the co-operating bodies for help.

**Dr. M. J. Sirks**

I AM a member of a small country—Holland —which has always tried to be more or less international because it is so small. I am a biologist, and as General Secretary of the International Union of Biologist Scientists I do not deny the importance of bringing biologists to other places to study ; but I agree that that is not the most important thing in internationalising universities. The most important thing is the study of the human mind and the ecology of man.

There are two ways in which UNESCO could bring into practice the internationalising of our universities. One of them is to send as many young people to other universities as possible. They would then be influenced by other minds when they are still impressionable. UNESCO should send as many students as possible to foreign countries, not only to study their own subjects but most of all to study other human minds, so that they get more and more of an international understanding. On the other hand we have heard statements about one large world university. Such a thing might be very useful, but I think we should have to send professors there rather than students. We have many professors who do not understand anything of foreign minds.

**Dr. J. C. Maxwell Garnett, C.B.E.**

BEFORE the meeting is closed, there are two things I should like to mention. In the first place it has been said that, in this country we are going to have a national body co-operating with UNESCO for education. It may be that we shall have a separate one for culture and a separate one for science. It may be that we should have nine or ten for all kinds of different things; but if we did it would be difficult for anybody to know where to go for information. There is a real need for UNESCO to make sure that sufficient provision is left behind in England for people to be able to get first-hand information about what is happening to UNESCO. It might be done through the Ministry of Education, or through a small office of UNESCO in London.

Secondly, the conference expressed their gratitude to Sir Alfred Zimmern for presiding this morning; we should like Miss Grier to know how grateful we were to her for her occupation of the Chair at the second session; and we are also much indebted to Professor Timmermans for presiding over our final session.

# THE FUTURE PATTERN OF THE BRITISH ASSOCIATION

THE following notes by the retiring Secretary, which expressed his own views, were circulated on the authority of the General Officers as a basis for discussion by the General Committee on July 20. The Council has under consideration the proposals here put forward, together with other suggestions made in the discussion.

A CURIOUS fact in the history of the British Association is that after certain outstanding events which have brought its activities under review, there have been expressions of opinion either that it has not fully discharged its functions, or that it has finally done so and might as well be disbanded. This happened after its jubilee meeting in 1881, which seems, nevertheless, to have been brilliantly successful, and after the centenary meeting in 1931, which certainly was so. It happened at the end of the war of 1914–18 when the Association resumed its full activities, and it is happening now.

The Association has never in fact been in danger of decease; but the opinions quoted above carry with them the suggestion that from time to time its wheels may have tended to get into ruts, from which some application of force was needed to extract them. This may well be so; in any case, the present is an opportune time for reviewing the Association's activities and future possibilities. Indeed it is not merely desirable but necessary to do this; for though the Association has continued its work, not without distinction, during the recent war, its officers know best how many contacts it has lost, how deeply into its foundations reconstruction must go if the new building is to arise soundly constructed in accordance with the traditions of the past and the new requirements of the future.

The specified objects of the Association, in brief, are these: to impel and direct scientific inquiry; to promote intercourse between scientists; to promote general (or public) interest in science; to remove obstacles from the path of scientific advance. These objects have been attained in the past. The Association has impelled and directed scientific inquiry in very many directions. It has promoted intercourse between scientists, at home and abroad. It has promoted public interest; it has removed obstacles to advancement. How can it best continue to do these things? Not, it will be suggested in the notes which follow, by sticking too closely to the old trail.

From the first, its activities centred or

followed wholly upon the Annual Meeting ; and the Annual Meeting, hallowed by tradition and still unique in this country as a peripatetic gathering representative of science at large, must no doubt remain the centre-piece. But its future as such should not be viewed from a wholly conservative standpoint. Profitable and enjoyable the annual meetings undoubtedly were for many, and will be again ; but perhaps not exactly on the old lines.

It is pertinent to recall what happened in 1919–20, after the first world war. After a lapse of two years (1917–18) when there were no annual meetings, the Association restarted in 1919–20 with meetings somewhat restricted in time (they ran within the calendar week, instead of from Wednesday to Wednesday, and the restriction was not popular) but otherwise on the old lines. They did not focus general attention in the traditional way and people began to ask why this was so.

A long correspondence and a leading article in *Nature* brought the question forward : eminent scientists and interested laymen contributed letters. Lodge, Pope, Eddington and others were kindly critical : Armstrong, according to his lights, asserted that the Association was run by a narrow clique, and was for practical purposes defunct. Among the interested laymen was no less a figure than Neville Chamberlain ; and the whole correspondence is worth study at this time. Various remedies were suggested : one enthusiastic writer prescribed a finance and propaganda committee, with its own director, secretary, and staff, who should secure funds estimated at astronomical magnitude for the advancement of science and of the Association. (And it may be for us now to invoke that dream again).

Criticism concentrated in the main, however, upon the tendency of the Association to overlook its object of promoting public interest in science, and upon the tendency of the Sections of the Association to maintain themselves and to do their work each as an individual entity unrelated to the rest.

As for public interest, it should be made clear now what these notes imply by that term. Using a rather objectionable phrase, the Association is intended to cater for all classes. The public or citizens' lectures (formerly ' lectures to the operative classes,' a phrase in the best Victorian tradition) have long been a feature of its programmes ; but for some years before 1914 they had become almost the only channel of appeal to interests outside the closed scientific circles. The public which the Association seeks, or should seek, to inform is not the ' operative classes ' or any other particular class, but, in brief, everybody who is not a practising scientist, but is capable of following a lecture by a scientist who is qualified to speak to a lay audience and remembers that he is doing so.

If any other particular class merits special consideration in the present connection, it is that of persons of the higher educational standards, whose education and walks in life have provided them with no knowledge of or interest in science. This is the sort of person who may be willing, and can afford, to join the Association for a meeting in his own locality ; but is not tempted to remain as a member or associate in subsequent years. Let us call him or her the well-educated layman. The Association has never hitherto offered the well-educated layman sufficient inducement to maintain perennial support by way of regular annual subscription.

We must return to this argument later : meanwhile, here are some of the principal points which emerged from the correspondence in *Nature* in 1920 and from inquiries made by the then General Secretaries, in consequence of that correspondence, among officers of the Sections.

It was argued that there were too many Sections. Opinion was sharply divided on this question, and less unevenly than might be expected. It had been realised before that the demands of thirteen Sections and additional Sub-sections each for its own separate meeting-room might and often did impose a strain on available accommodation at the place of meeting, and that it was sometimes impossible to avoid scattering Section-rooms all over a town. Already in 1911 a scheme had been put forward for a division of the Sections into ' whole-time ' and ' part-time,' of which the second category would have shared rooms ; but nothing came of this. Now, in 1920, a scheme for the grouping of Sections was worked out, but was not followed up. The Sections, as such, were not individually attacked, because it was felt, no doubt rightly, that to abolish or merge any of them would tend to absenteeism on the part of a number of members whose interests were highly specialised. Actually the process of specialisation has grown stronger : in meetings shortly before the last war there were not infrequent instances of Sections

dividing parts of their programmes into two or even more convenient divisions.

It was further argued that the programmes were too full ; and certainly this defect, if such it be, grew worse in the period between the wars. In the last completed programme before the recent war there were nearly 480 individual items. Over 400 of these were communications to Sections or departments of Sections. There were over 50 excursions and visits, all but 11 of them sectional. On the lighter side, there were a dozen receptions or parties, and there were the two Evening Discourses and the Presidential Address.

It might appear from this that the discussions in 1920 were of no effect. And certainly such a plethora may lead to unfortunate results. There is on record (though not on the occasion cited above) the case of a Sectional meeting which consisted of the President and the reader of the paper announced in the programme. The President played his part : he settled down to discuss the subject of the paper across the table with its author, a young man, who doubtless benefited. But neither deserved to encounter such a situation. There is the case, again, of a sectional excursion, when the local representatives detailed to receive the party substantially outnumbered the party itself, the bulk of the visitors having gone elsewhere. And the present writer can feelingly recall efforts to insure at least an appearance of support for some less attractive item in an overcrowded programme. The overcrowding of programmes has been a too common phenomenon.

Coupled with this view there was in 1920 a group of opinions to the effect that there should be more joint meetings of Sections ; that the programmes should be restricted mainly to (what were called) ' a few definite matters of actual moment ; ' that the outstanding features should be ' semi-popular ' lectures of general interest, and that in this connection more careful account should be taken of the capacity of a speaker as such.

As regards joint meetings of Sections, the discussion had a definite outcome. For there were instituted the joint meetings of sectional committees which were held early in each year to propose subjects and formulate plans for the consideration of major topics—' border-line ' subjects—by two or more Sections meeting together ; and also to give guidance in the arrangement of major items such as these and the sectional presidential addresses so as to avoid a clash of subjects of kindred interest in the programme.

This was a step justified by results. It inculcated the idea that at any moment in the the programme, every person attending a meeting of the Association ought to be able to find something of interest to him or her. And there followed, until 1939, a succession of Annual Meetings at which the average attendance was higher than ever before over a similar period. Granted that public interest in science was growing (as it still is), it seemed that the Association was becoming more widely recognised as effectively seeking to stimulate that interest.

But some of the consultants of 1920 would have gone further, and empowered a central body—whether the Council or a Committee of the Council—to lay down the main lines of the whole programme, including evening lectures (of which, it was argued, there should be more than the usual two), and subjects of broad and current interest to be dealt with in major sessions to the number of five or six, each day. The Sections would be instructed to make their contributions to these subjects as requisite and appropriate : for the rest, it would be understood that their specialist members were at liberty, if they wished, to form groups or departments for papers and discussions of narrower appeal, which should not be announced in the main body of the programme. This was an attempt to meet both general and special interests and to distinguish more clearly between them, and somewhere along these lines would seem to lie whatever reform of the programmes of the Annual Meetings may be found desirable. For it can scarcely be denied that programmes were becoming cumbrous to a degree. The recent revision of the Statutes and Regulations has been designed, *inter alia*, to simplify administration, especially during the Annual Meeting : it would seem that a simplification of programmes might well follow upon this reform.

The stronger emphasis upon the broader interests of programmes will be more necessary in the immediate future, not only because of the growing public interest in science, with which the Association must keep pace if it is to flourish, but, in particular, because its annual meetings will depend even more than in the past upon the support of residents in the localities where they are held. The restoration of travelling facilities, housing accommodation for visiting members, hospitality and so forth, cannot be expected im-

mediately up to pre-war standard. For this reason the proportion of visiting to local members and associates at the next few annual meetings is not likely to be as large as it used to be. This consideration, among others, leads back to the question already suggested : how is the Association to attract and hold a larger permanent body of annual subscribers ?

The need to do this has recently been stressed by the General Treasurer. So it is necessary to ask what the Association offers to permanent subscribers.

First, it offers a principle ; a cause worthy of support. It is, technically, a charitable institution, devoted to the cause of advancing science, and especially, in these times, of advancing science for the benefit of humanity, of achieving which object one of the primary methods is to show, as widely as possible, how the advancement of science does benefit humanity. Many scientists are prepared and qualified to participate actively in this crusade. Others are not, but nevertheless believe in it, or should be brought to do so. All such, whether active participants or not, should support the Association. There were those who, in 1920, argued that the Association should improve its propaganda, and it is true that its propaganda has never been really effective, except when, in preparation for an annual meeting, local progagandist genius found expression among the local public. That has often happened ; but the Association has never formulated a standing propaganda programme. Here, then, is a possible opportunity, and a theme.

But the cause, by itself, is not enough. A prospective supporter must be enabled to say, not merely ' I believe in your cause,' but ' I believe in what you are doing in furtherance of your cause.' Now if it be granted that though the Association's Annual Meeting remains the principal focus of its activities, nevertheless it should not be the only one, it becomes necessary to consider other activities which it now prosecutes.

We need not discuss in detail its support of research, which occupies an old and honourable place in its history, except to observe that the original policy was to initiate inquiry rather than permanently to support it by way of grants from the Association's funds ; and a reversion to this policy is indicated by the recently approved rule limiting financial support of any research committee to an aggregate period of five years from 1946. By this means the possible field for initiation ought to be widened, for the Annual Meeting has always afforded a valuable occasion for discovering desirable directions of inquiry.

More recent in the Association's history are the following events : the incorporation of the British Science Guild into the Association ; the formation of the Division for the Social and International Relations of Science ; the creation of mechanism for closer liaison with the American Association for the Advancement of Science ; the dispatch of a scientific delegation overseas (to India in 1937, the first such party to be sent independently of an overseas meeting) ; the acquisition and custody of Charles Darwin's house at Downe as a national memorial ; and a fundamental reform of the Association's official publication. Each of these acts has its bearing on the future pattern.

The organisation of science through societies has not, on the whole, been distinguished either for collaboration or for cohesion. There is no lack of examples of the foundation of more than one society in the same field of science, when it might have been supposed that a single society, by an extension of its functions, would have provided a more efficient mechanism. Examples could be found of organisations set up to do, in particular fields, work which the British Association itself might have done. Indeed, the British Science Guild provided an example, for the Association was offered and rejected the opportunity of extending its operations into the sphere of contact between scientific and lay interests upon which the Guild was subsequently founded to enter. Those, therefore, who believed in the principle of strength through union were justifiably gratified when at length the Association, not without dispute, was brought to incorporate the Guild into its own organisation. By doing so it assumed the obligation of maintaining the lectures commemorative of Norman Lockyer and Alexander Pedler. This was a new duty leading the Association to organise lecture-meetings outside its own annual meetings : sometimes these lectures have been given during the meetings of other bodies—a welcome approach towards fuller collaboration between kindred societies. For such collaboration cannot be otherwise than beneficial, and it is to be hoped that the new scheme of organisation for the entrance of societies into correspondence with the Association, recently presented in the revised Statutes and Regulations, and far more elastic than the previous plan, will be applied to the strength-

ening of co-operation and the discovery of common interests between many scientific bodies hitherto aloof from the Association and from each other.

On this same ground alone the establishment of the Division for the Social and International Relations of Science (1938), within the Association, is to be welcomed, for if it had not been so established, yet another separate scientific organisation would very likely have been brought into existence. By its constitution the Division ought in the future to widen public 'attention for science' and the work of the Association. Indeed, it has done so already, for during the war its activities kept the Association alive. Without it, during the past six years, the Association must needs have passed temporarily, if not finally, to rest. The Division has not escaped criticism, mainly, it would appear, on the grounds that it has tended to lead the Association in the direction of political controversy, and to usurp the functions of certain sections. As to the first objection, when science is so increasingly permeating human interest at large that its increasing contact with political considerations is inevitable, it would surely be worse than useless for such a body as the Association to ignore such trends: on the contrary, the fullest consideration ought to be given to them, provided that the Association rigidly excludes any appearance of party bias. As for the usurpation of sectional functions, the Division was specifically charged at its foundation to collaborate with appropriate Sections whenever occasion should demand; and at the time of writing this memorandum two conferences are actually in preparation by committees jointly representing the Division and individual Sections. Any apparent failure to do this during the war may be fairly attributed to the necessary cessation of activities of the Sections themselves. Lastly, the competence of the Division to hold meetings independently of the Association's Annual Meeting should make it possible to extend the direct influence of the Association into provincial centres in which a full Annual Meeting could not be accommodated. That is one of the Division's objects: it is a consequence only of the war that it has not been given fuller effect.

The title of the Division includes the word 'international,' and the strengthening of international relations across the North Atlantic Ocean was foreshadowed when, in 1938, it was arranged with the American Association for the Advancement of Science to afford members of either body certain facilities in connection with the activities of the other, and to institute a lecture to be given, at the meetings of the two Associations in alternate years, by an American speaker at our own meeting, or by a British speaker at theirs. The war prevented this scheme from being put into practice; but it should now be revived, and perhaps extended, in due time, to embody the principle of the delegation referred to in the next paragraph.

The scientific delegation to India in 1937-38 was a new step in the history of the Association. There had, of course, been Annual Meetings overseas. Will there ever be another? The time for it would at least seem to be distant, and the likelihood subject to some great economic change, for the cost under present conditions would be enormous. Moreover, the delegation offers possibilities which the Annual Meeting does not. The delegation can be of a size commensurate with its objects and with the receiving capacity of its destination. Its personnel can be chosen to suit its purpose, whereas, in the past, not all the travelling members who have attended annual meetings overseas have proved themselves worthy missionaries of science. But the principle of the overseas delegation should by all means be encouraged, and it is not unreasonable to claim that the British Association, its relations with corresponding bodies in the Dominions and India already established, is the most appropriate organisation through which that encouragement should be given.

When the British Association, the recipient in 1928 of the Royal Charter as a body corporate, accepted in the following year the honourable gift of Down House, Charles Darwin's home, to hold and maintain as a national memorial, the question was occasionally heard, 'why should the British Association be given this trust?' A simple answer would have been that the donor, the late Sir Buckston Browne, chose it so; but he had full historical justification. For of all the public disputes between science and orthodox belief (as orthodoxy was then accounted) which followed upon the publication of the *Origin of Species*, the British Association had provided a platform for the most noteworthy; moreover, it was Sir Arthur Keith's presidential address to the Association in 1927, when he pleaded for the preservation of the house as a memorial, that led to the receipt of Sir Buckston Browne's famous offer on the

following morning. This unique scientific memorial has justified its existence as a place of pilgrimage; its possession has brought honour to the Association, and in some measure has spread knowledge of the Association's work—this last condition is capable of development now that the memorial is re-opened to the public since the war. And no opportunity should be lost of making Down a centre of appropriate scientific activity. The Association should aim to acquire what it does not yet possess, an assured financial position which would make it possible to support any movement in this direction, while also maintaining the house and property in a condition befitting the memory to which it is dedicated.

Last among recent changes in the Association's affairs, we come to the change from the publication of an annual volume of reports to that of a quarterly, *The Advancement of Science*. This change was decided upon in 1938, and hitherto *The Advancement of Science* has appeared only under war conditions (not ameliorated since the end of the war). Nevertheless, the avowed intention of publishing the transactions of the Association in a form at once more useful and more attractive than that in which they were formerly enshrined, or entombed, in the annual volume, has shown encouraging signs of meeting with appreciation. It is essential that this appreciation should be fostered. For the right to receive *The Advancement of Science* is the 'privilege of membership' coupled with attendance at meetings; associateship offers *either* such attendance, *or* receipt of the publication. *The Advancement of Science* must therefore be made a real attraction to membership and associateship. The Association's annual meetings and other activities offer ample material for a publication which should come to be regarded as at once authoritative by scientific workers and attractive and informative by the public who seek attraction to, and information upon, the manifold interests of science. These two objects are not incompatible: it is a matter of urgency that the way to achieve them should be worked out and put into practice. The Association in possession of its own widely-read organ of publication will acquire a far stronger position than that of its former dependence upon the support of the Press at large for the public record of its proceedings, generous as that support has always been.

What then, in summary, may be offered as the future pattern?

(1) A modification of the programme of the Annual Meeting, to the extent of integrating it more closely, through a central controlling mechanism, with subjects of broad, public, and current interest; while by no means diminishing the opportunities it has always offered for scientific workers to meet each other in their own special fields of interest.

(2) The traditional use of the Annual Meeting as an occasion to forward schemes for new scientific inquiry and for advancing science by any other means.

(3) The systematic use of the Annual Meeting as a source of material for publication in such form as to appeal more widely than heretofore, especially to the interested public.

(4) The establishment of standing regional organisations. Such organisations, set up each year in a different centre for successive annual meetings, have hitherto been allowed to lapse after the meetings. They should be maintained. The Division also has its part to play here, with its power to hold local conferences; so have the Corresponding Societies, under the more elastic conditions prescribed by the recently amended Statutes and Regulations.

(5) An extension of the functions of the Association as the recognised authoritative source of systematic communication on science to the public through the press and other channels: the establishment of a department of the Association's organisation charged with this function.

(6) The creation of stronger links between the establishment at Down House and (*a*) appropriate scientific inquiry; (*b*) the public interest in science generally.

(7) The strengthening of international co-operation in science, by means of closer and more systematic relations with kindred organisations in the Dominions and foreign countries, through delegations, the exchange of information, and any other methods of practical co-operation.

Such new structure, incorporated into the old, implies strengthening the foundations through adequate financial provision. New activities will necessitate an increased staff, and, most assuredly, more adequate housing for the central office in London. As the plan of such activities emerges, money must be collected to implement it. A drive for new membership should deserve success—the regional organisation suggested above should prove invaluable here—and the inauguration

of endowment funds for specific purposes, such as the establishment of a science news organisation, or the adequate support of Down House independently of the Association's general funds, would be more than justifiable.

These notes will have failed in their purpose if they do not suggest new roads along which the British Association may achieve the advancement of science, which is its function. 'We exhibit no symptom of decay,' said a former President in his address on one of these occasions when, as indicated at the beginning of this review, the future welfare of the Association was in some doubt. Today, it is not sufficient merely to exhibit no symptom of decay : to exhibit signs of new growth is the need.

# REPORT OF THE COUNCIL TO THE GENERAL COMMITTEE, JULY, 1946

[The previous Report of the Council was carried down to December 13, 1945.]

## Obituary

The Council have to deplore the loss by death of the following office-bearers and supporters :—

Dr. E. F. Armstrong, F.R.S.
Prof. E. G. Coker, F.R.S.
Prof. A. E. Dixon
W. D. Eggar
H. B. Maufe
Sir D. Milne-Watson, Bt.
Dr. E. B. R. Prideaux
E. A. Reeves
Prof. E. Shearer

The President of the Association, Sir Richard Gregory, Bt., F.R.S., was present at a memorial service for Dr. E. F. Armstrong, F.R.S., a former member of Council and sectional president.

Prof. A. E. Dixon was a life-member of the Association for over 71 years.

## Relations with other Institutions

Dr. J. L. Simonsen, F.R.S., represented the Association at the annual dinner of the Society of Dyers and Colourists.

Prof. C. J. Patten was appointed to represent the Association at the installation of the Rt. Hon. the Earl of Harewood, K.G., as Chancellor of the University of Sheffield.

Dr. O. J. R. Howarth was appointed to deliver the Alexander Pedler Lecture of the Association, on Charles Darwin's Life at Downe, at the Congress of the South-Eastern Union of Scientific Societies, 1946.

## Annual Meetings and Conferences

In connection with the Annual Meeting on July 20 this year, the thanks of the Association are due to the British Medical Association for the use of its halls by the Council and the General Committee, and for the Presidential Address ; and to the Geological Society for the use of its rooms for a soirée.

A Conference was arranged on July 8, 1946, in collaboration with the Royal Society and in connection with that Society's Empire Scientific Conference, on the Dissemination of Scientific Information to the Public, through the Press, broadcasting, films, exhibitions, etc. The Officers of the Association particularly welcomed this opportunity since a representative meeting of journalists had previously invited the Association to collaborate in considering means of improving contact between the Press and scientific research. The Managers of the Royal Institution kindly consented to the use of their theatre for this Conference. The Conference adopted a resolution which invited the Council to take steps to establish an Institute of Scientific Information, and this is receiving the Council's attention.

A Conference has been arranged jointly by Section L (Education) and the Division for the Social and International Relations of Science, on UNESCO and Universities, to be held, by kind permission, in the hall of the Royal Institution of British Architects on July 25.

A joint Conference of Section G (Engineering) and the Division for the Social and International Relations of Science, dealing with London Traffic and the London Plan, is intended to take place in September.

Invitations to the Association to hold its Annual Meeting in Dundee in 1947, and in Brighton in 1948, have been gratefully accepted. Invitations from Newcastle-upon-Tyne for 1949 and Birmingham for 1950 will be submitted.

## Officers and Council

The Council's nomination to the office of President of the Association for the year 1947 is Sir Henry Dale, O.M., G.B.E., F.R.S.

The Council most gratefully recognise the invaluable services of Sir Harold Hartley, K.C.V.O., C.B.E., F.R.S., as General Treasurer, and of Prof. F. T. Brooks, F.R.S.,

Prof. Allan Ferguson, and Prof. D. Brunt, F.R.S., as General Secretaries, who will retire from office at the Annual Meeting in July. The Council nominate the following as their successors :—

General Treasurer : M. G. Bennett.

General Secretaries : Dr. Edward Hindle, F.R.S., Prof. Sir John Lennard-Jones, K.B.E. F.R.S.

Under the revised Statute, the Council nominate the following twenty-eight Ordinary Members of the Council, leaving two vacancies to be filled by the General Committee without nomination by the Council :—

Prof. F. C. Bartlett, C.B.E., F.R.S.
Prof. D. Burns
Dr. C. D. Darlington, F.R.S.
Sir Charles Darwin, K.B.E., F.R.S.
Sir Fred Clarke
Prof. W. E. Le Gros Clark, F.R.S.
Dr. H. J. T. Ellingham
Prof. C. B. Fawcett
Sir Arthur Fleming, C.B.E.
Prof. H. J. Fleure, F.R.S.
Prof. F. E. Fritsch, F.R.S.
Sir John Fryer
Dr. J. C. Maxwell Garnett, C.B.E.
Sir John Graham Kerr, M.P., F.R.S.
R. F. Harrod
Dr. O. J. R. Howarth
Prof. B. A. McSwiney, F.R.S.
Prof. C. A. Mace
Prof. J. W. Munro
Prof. E. H. Neville
Dr. W. G. Ogg
Prof. H. H. Read, F.R.S.
Prof. H. R. Robinson, F.R.S.
Dr. J. L. Simonsen, F.R.S.
Prof. J. G. Smith
D. R. V. Southwell, F.R.S.
Dr. C. J. Stubblefield, F.R.S.
Sir Henry Tizard, K.C.B., F.R.S.

The Council have conveyed to retiring members an appreciation of their services during the difficult years of the war.

They have also expressed their thanks to Miss C. R. Courcier and Miss A. Douglas for their valuable services in the office during the war.

As from the end of the annual meeting, Dr. O. J. R. Howarth retires from the post of Secretary, which he has occupied since 1909, and is succeeded by Mr. D. N. Lowe. In this connection the Council have adopted the following resolution :

"In taking leave of Dr. O. J. R. Howarth, who retires from the post of Secretary as from July 20, the Council wish to place on record their warm appreciation of his faithful and distinguished service. His work has been characterised by a selfless devotion to the interests of the Association over a period of thirty-seven years, and it is impossible to speak too highly of his contribution to the continued success of the Association during that long period, or of the service he has rendered to the advancement of Science and to several generations of scientists. The Council hope that he will continue to play an active part as one of their members and are gratified to know that he has accepted their invitation to remain at Down House as Curator of the collections which are a national memorial to Charles Darwin."

## Finance

The Association was a beneficiary in the sum of £1,000, under the will of the late Dr. F. W. Aston, F.R.S., and has received a gift of £100 for research, in honour of Miss Corcoran, a former member, from a donor who wishes to remain anonymous.

The General Treasurer's Statement and Account for the financial year ending March 31, 1946, will be submitted to the General Committee.

## Down House

Since the re-opening of the Darwin Memorial rooms and the grounds to the public last October, there has been a substantial number of visitors, though this does not as yet nearly approach the average before the war.

Among the most recent gifts is that of a list of books in T. H. Huxley's library, compiled in his own hand. This gift was received from Prof. Allan Ferguson and Mr. Philip Allan. Prof. and Mrs. Ferguson have presented to the Association their collection of biographies of men of science, and Miss Norah Lodge has given some of the works of Sir Oliver Lodge, F.R.S. The Council have warmly thanked these donors.

A new catalogue, necessitated by gifts received during and since the war, and by the re-arrangement of the collection, has been prepared and issued.

The restoration of the house and grounds proceeds gradually ; but the house staff remains incomplete.

The experimental cultivation of *Lythrum salicaria* continues.

The precipitation recorded by the standard rain-gauge in 1945 was 30.09 ins.

## BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

# GENERAL TREASURER'S STATEMENT AND ACCOUNT, 1945–46

THERE is an excess of £110 of Income over Expenditure in the General Account, due, as in previous years, to various factors which will not recur. This is the last year but one in which we shall receive anything from the Yarrow Fund, and a grant for publications from the Rockefeller Fund received through the Royal Society again appears, possibly for the last time. A larger amount than usual (£265) has been brought into Income from the temporary Life-Compositions Investment Account as the result of a recent resolution by the Council under which expiry of membership has, after inquiry, been presumed in certain cases.

As to Capital, Mr. Arthur Haydock's bequest of £2,090, mentioned last year, has now been brought into the Balance Sheet. The Accumulated Fund shown therein has been increased by £3,603 as the result of the sale of a block of 2½ per cent. Consols and reinvestment in 3 per cent. Savings Bonds, 1965–75, which will give a slightly bigger yield.

The position of Down House revealed by these accounts needs special consideration. A sum of £204 has been transferred to the Down House Account from the Property Rehabilitation Fund. An excess of £291 Expenditure over Income is, however, still shown. Close inquiries into all the circumstances have revealed no way in which the gap between Income from the Down House Endowment and Expenditure can be closed. Agricultural wages for the upkeep of the land are increasing, and essential repairs are also becoming more costly. This is a matter of very anxious consideration by the Council.

Taking a broad view of the future, if the new and renewed activities of the Association receive the support which they merit there would appear to be no reason why the financial postition should not again become as sound as it was before the War. There is, however, a difficult interim period to navigate before we reach that happy position. Fortunately we have been able to build up a Contingency Fund during the War, which was, of course, intended to meet just such a situation as has now arisen. It will probably be necessary to draw upon this fund to some extent.

The British Association, like all other institutions in this world, has come through a great crisis in its existence, and has emerged into a new world to which it must adapt itself. Undoubtedly there are many services which the Association can render to Science, and the amount of support the Association obtains will dictate how largely the Council will be able to put into operation its various plans for new developments.

The resumption of Annual Meetings will presumably restore our membership, but something more than a return to pre-war membership will be needed if the Association is going to be able to continue to carry out all its responsibilities as one of the oldest and broadest scientific institutions, with the tradition, organisation and contacts which must be used to the full if all the aims and objects of scientists to play a fuller part in the life of the community are to be realised.

H. HARTLEY,
*General Treasurer.*

# Balance Sheet, 31st March, 1946

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

## LIABILITIES

| | £ s. d. | £ s. d. |
|---|---|---|
| GENERAL PURPOSES :— | | |
| Sundry Creditors | 43 17 3 | |
| Amounts received in advance for publications | 37 18 4 | |
| Membership subscriptions in advance | 44 8 0 | |
| | | 126 3 7 |
| Hon. Sir Charles Parsons' gift (£10,000 and legacy (£2,000) | | 12,000 0 0 |
| Sir Alfred Ewing's legacy (1935) | | 500 0 0 |
| Dr. C. D. Sherborn's legacy (1943) | | 500 0 0 |
| Lady Mary Lockyer's legacy (1944) | | 1,000 0 0 |
| British Science Guild : Capital Fund | | 3,431 9 1 |
| *Accumulated Fund* | | |
| As per last Account | 15,542 6 5 | |
| *Add* Profit on sale of stock | 3,603 7 3 | |
| | | 19,145 13 8 |
| *Yarrow Fund* | | |
| As per last Account | 1,334 6 4 | |
| *Add* Profit on sale of stock | 24 8 10 | |
| | 1,358 15 2 | |
| *Less* Transferred to Income and Expenditure Account under terms of gift | 503 6 0 | |
| | | 855 9 2 |
| *Life and Corporation Membership Compositions* | | |
| As per last Account | 4,578 9 2 | |
| *Add* Received during year : Life Compositions | 194 5 0 | |
| | 4,772 14 2 | |
| *Less* Transferred to Income and Expenditure Account | 265 12 2 | |
| | | 4,507 2 0 |
| *Grants Equalisation Fund* | | 2,000 0 0 |
| *Contingency Fund* | | |
| As per last Account | 1,866 8 7½ | |
| *Add* Excess of Income over Expenditure for the year, on General Account | 110 15 4 | |
| | | 1,977 3 11½ |
| *Overseas Delegations Fund* | | 781 3 11 |
| *Secretary's Pension Fund* | | |
| As per last Account | 2,175 19 5 | |
| *Add* Income for the year | 64 6 2 | |
| | | 2,240 5 7 |
| [*46,119 2 8½*] | | 49,064 10 11½ |
| SPECIAL PURPOSES :— | | |
| *Caird Fund* | | |
| Capital as per last Account | 9,928 17 9 | |
| Revenue balance as per last Account 438 8 11 | | |
| *Add* Excess of Income over Expenditure for the year 227 17 10 | | |
| | 666 6 9 | |
| [*10,367 6 8*] | | 10,595 4 6 |
| *Mathematical Tables Fund* | | |
| As per last Account | 191 7 3 | |
| *Add* Receipts from sales | 21 15 0 | |
| | 213 2 3 | |
| *Less* Grant paid | 5 0 0 | |
| [*191 7 3*] | | 208 2 3 |
| *Cunningham Bequest Fund* | | |
| As per last Account | 1,440 16 10 | |
| *Add* Excess of Income over Expenditure for the year | 58 16 4 | |
| [*1,440 16 10*] | | 1,499 13 2 |
| *Toronto University Presentation Fund* | | |
| Capital | 178 11 4 | |
| Revenue balance as per last Account 22 15 0 | | |
| *Add* Income for the year 6 2 6 | | |
| | 28 17 6 | |
| [*201 6 4*] | | 207 8 10 |
| *Bernard Hobson Fund* | | |
| Capital | 1,000 0 0 | |
| Revenue balance as per last Account 196 4 6 | | |
| *Add* Income for the year 35 14 6 | | |
| | 231 19 0 | |
| [*1,196 4 6*] | | 1,231 19 0 |
| [*59,516 4 3½*] Carried forward | | 62,806 18 8½ |

## ASSETS

| | £ s. d. | £ s. d. |
|---|---|---|
| GENERAL PURPOSES :— | | |
| Investments as scheduled with Income and Expenditure Account, No. 1 | 48,648 1 2 | |
| Sundry debtors and payments in advance | 88 4 1 | |
| Cash at bank | 324 5 9 | |
| Cash in hand | 3 19 11½ | |
| [*46,119 2 8½*] | | 49,064 10 11½ |
| SPECIAL PURPOSES :— | | |
| *Caird Fund Account* | | |
| Investments (see Income and Expenditure Account, No. 2) | 9,928 17 9 | |
| Cash at bank | 666 6 9 | |
| [*10,367 6 8*] | | 10,595 4 6 |
| *Mathematical Tables Fund Account* | | |
| Cash at bank | 191 12 3 | |
| Debtor | 16 10 0 | |
| [*191 7 3*] | | 208 2 3 |
| *Cunningham Bequest Fund Account* | | |
| Investments (see Income and Expenditure Account, No. 3) | 1,390 12 4 | |
| Cash at bank | 108 12 10 | |
| Debtor | 8 0 | |
| [*1,440 16 10*] | | 1,499 13 2 |
| *Toronto University Presentation Fund Account* | | |
| Investment (see Income and Expenditure Account, No. 4) | 178 11 4 | |
| Cash at bank | 28 17 6 | |
| [*201 6 4*] | | 207 8 10 |
| *Bernard Hobson Fund Account* | | |
| Investments (see Income and Expenditure Account, No. 5) | 1,150 0 0 | |
| Cash at bank | 81 19 0 | |
| [*1,196 4 6*] | | 1,231 19 0 |
| [*59,516 4 3½*] Carried forward | | 62,806 18 8½ |

# Balance Sheet, 31st March, 1946 (*continued*)

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

## LIABILITIES (*continued*)

| | £ s. d. | £ s. d. |
|---|---|---|
| [*59,516 4 3½*] Brought forward | | 62,806 18 8½ |
| ***Leicester and Leicestershire Fund*, 1933** | | |
| Capital . . . . . | 1,000 0 0 | |
| Revenue balance as per last Account . . 6 0 10 | | |
| *Add* Income for the year 34 4 2 | | |
| | 40 5 0 | |
| [*1,006 0 10*] | | 1,040 5 0 |
| ***Property Rehabilitation Fund*** | | |
| Balance as per last Account . . | 330 10 11 | |
| *Add* Profit on sale of stock . . | 9 4 7 | |
| | 339 15 6 | |
| *Less* Excess of Expenditure over Income for the year . . | 195 15 6 | |
| [*400 0 0*] | | 144 0 0 |
| ***Radford Mather Lecture Fund*** | | |
| Capital . . . . . | 250 0 0 | |
| Revenue balance as per last Account . . 29 8 7 | | |
| *Add* Income for the year 7 9 4 | | |
| | 36 17 11 | |
| [*279 8 7*] | | 286 17 11 |
| ***Mrs. E. M. Musgrave's Legacy* (1944)** | | |
| Balance as per last Account . . | 225 0 0 | |
| *Less* Expenditure for the year . | 75 0 0 | |
| [*225 0 0*] | | 150 0 0 |
| ***Arthur Haydock Bequest* (1945)** | | |
| Capital . . . . . | 2,215 12 0 | |
| Income for the year . . . | 18 5 9 | |
| [Nil] | | 2,233 17 9 |
| ***Down House*** | | |
| Endowment Fund balance as per last Account . . . . | 21,204 17 8 | |
| *Add* Profit on redemption of stocks | 91 11 9 | |
| | 21,296 9 5 | |
| Library Fund . . . . . | 10 10 0 | |
| *Suspense Account* | | |
| Balance as per last Account . . 473 8 6½ | | |
| *Less* Excess of Expenditure over Income for the year . 291 13 1 | | |
| | 181 15 5½ | |
| Creditors . . . . . | 53 10 8 | |
| [*21,710 11 7½*] | | 21,542 5 6½ |
| [*83,137 5 4*] | | £88,204 4 11 |

## ASSETS (*continued*)

| | £ s. d. | £ s. d. |
|---|---|---|
| [*59,516 4 3½*] Brought forward | | 62,806 18 8½ |
| ***Leicester and Leicestershire Fund*, 1933, *Account*** | | |
| Investments (see Income and Expenditure Account, No. 6) . | 1,000 0 0 | |
| Cash at bank . . . . . | 40 5 0 | |
| [*1,006 0 10*] | | 1,040 5 0 |
| ***Property Rehabilitation Fund Account*** | | |
| Investment (See Income and Expenditure Account, No. 7) . | 109 4 7 | |
| Cash at bank . . . . . | 34 15 5 | |
| [*400 0 0*] | | 144 0 0 |
| ***Radford Mather Lecture Fund Account*** | | |
| Investment (see Income and Expenditure Account, No. 8) . | 250 0 0 | |
| Cash at bank . . . . . | 36 17 11 | |
| [*279 8 7*] | | 286 17 11 |
| ***Mrs. E. M. Musgrave's Legacy Account*** | | |
| (See Income and Expenditure Account, No. 9) | | |
| Cash at bank . . . . . | | 150 0 0 |
| [*225 0 0*] | | |
| ***Arthur Haydock Bequest Account*** | | |
| Investment (see Income and Expenditure Account, No. 10) . | 2,215 12 0 | |
| Cash at bank . . . . . | 18 5 9 | |
| [Nil] | | 2,233 17 9 |
| ***Down House Account*** | | |
| Investments (see Income and Expenditure Account, No. 11) . . . | 21,296 9 5 | |
| Sundry debtors and payments in advance . . . . . | 22 14 11 | |
| Cash at bank . . . . . | 193 12 2 | |
| Cash in hand . . . . . | 29 9 0½ | |
| [*21,710 11 7½*] | | 21,542 5 6½ |
| [*83,137 5 4*] | | 88,204 4 11 |

We have examined the foregoing Account with the Books and Vouchers and certify the same to be correct. We have also verified the Balance at the Bankers and the Investments, and have inspected the Deeds of Down House.

Approved :
EZER GRIFFITHS
ROBERT S. WHIPPLE } *Auditors.*

W. B. KEEN & CO., *Chartered Accountants*,
Finsbury Circus House, London, E.C.2
28th June, 1946.

# INCOME AND EXPENDITURE ACCOUNTS FOR THE YEAR ENDED 31st MARCH, 1946

## No. 1. General Income and Expenditure

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ | s. | d. |
|---|---|---|---|---|
| | *Investments at cost :* | | | |
| | £3,886 8s. 2d. Consolidated 2½ per cent. Stock (Inscribed) | 2,901 | 3 | 0 |
| | £1,252 16s. 2d. Consolidated 2½ per cent. Stock (Registered) | 1,000 | 0 | 0 |
| | £1,000 0s. 0d. 3 per cent. Savings Bonds 'A,' 1960/70 | 1,000 | 0 | 0 |
| | £5,268 19s. 0d. 3 per cent Savings Bonds 'B,' 1955/65 | 5,268 | 19 | 0 |
| | £18,450 0s. 0d. 3 per cent. Savings Bonds, 1965/75 | 19,148 | 11 | 9 |
| | £879 14s. 9d. Great Indian Peninsula Railway 'B' Annuity, £43 | 827 | 15 | 0 |
| | £52 12s. 7d. 3½ per cent. War Stock (Post Office issue) | 54 | 5 | 2 |
| | £7,370 19s. 6d. 3½ per cent. War Stock | 7,426 | 18 | 8 |
| | £6,368 15s. 7d. 3½ per cent. Conversion Stock | 5,304 | 8 | 11 |
| | £4,184 18s. 2d. 3 per cent. Local Loans | 3,073 | 12 | 2 |
| | £1,000 0s. 0d. 4 per cent. Funding Loan Stock, 1960/90 | 1,170 | 0 | 0 |
| | £100 0s. 0d. 5 per cent. Great Western Railway Consolidated Preference Stock | 125 | 0 | 0 |
| | £345 16s. 8d. 3 per cent. London County Consolidated Stock, 1956/61 | 347 | 7 | 6 |
| | £981 10s. 0d. 4 per cent. Commonwealth of Australia Stock 1955/70 | 1,000 | 0 | 0 |
| *[Value of stocks at 31/3/45, £51,213 7s. 4d.]* | (Value at 31/3/46, £53,753 11s. 6d.) | | | |
| *[45,523 11 1]* | | £48,648 | 1 | 2 |
| | Cash at bank and in hand | £328 | 5 | 8½ |

### EXPENDITURE

| | | £ | s. | d. |
|---|---|---|---|---|
| | To Heat, Lighting and Power | 37 | 15 | 5 |
| | „ Stationery | 105 | 10 | 2½ |
| | „ Rent | 1 | 0 | 0 |
| | „ Postages | 99 | 9 | 2 |
| | „ Travelling expenses | 28 | 18 | 5 |
| | „ Audit | 31 | 10 | 0 |
| | „ Legal advice | 4 | 4 | 0 |
| | „ Subscription to Parliamentary and Scientific Committee | 10 | 10 | 0 |
| | „ Hire of meeting rooms | 19 | 2 | 9 |
| | „ Reporting of Division meetings | 26 | 8 | 0 |
| | „ Lift inspection and repairs | 88 | 5 | 5 |
| | „ General expenses | 92 | 1 | 6 |
| | „ Salaries, wages, and office cleaning | 2,105 | 16 | 4 |
| | „ Pension contributions | 80 | 7 | 2 |
| | „ Printing, etc. | 732 | 4 | 9 |
| | „ Payment to authors for contributions to "The Advancement of Science" to be reprinted as pamphlets | 84 | 0 | 0 |
| | „ Air raid precautions at Burlington House | 3 | 0 | 0 |
| | „ Hospitality (Luncheon to speakers) | 24 | 1 | 0 |
| *[3,251 19 7]* | | 3,574 | 4 | 1½ |
| *[177 0 9½]* | „ Balance, being excess of Income over Expenditure for the year, transferred to Contingency Fund | 110 | 15 | 4 |
| *[3,429 0 4½]* | | £3,684 | 19 | 5½ |

### INCOME

| | | £ | s. | d. |
|---|---|---|---|---|
| | By Annual membership subscriptions | 322 | 12 | 0 |
| | „ Life compositions : amount transferred on expiry of membership | 265 | 12 | 2 |
| | „ Donations received | 25 | 5 | 0 |
| | „ Sale of publications . . 479 14 6½ | | | |
| | *Less* amount transferred to Mathematical Tables Fund . 21 15 0 | | | |
| | | 457 | 19 | 6½ |
| | „ Royal Society (Rockefeller grant) | 400 | 0 | 0 |
| | „ Advertisements in B.A. publications | 167 | 0 | 0 |
| | „ Income Tax recovered | 32 | 9 | 2 |
| | „ Interest on investments | 1,482 | 11 | 10 |
| | „ Interest on current account | 7 | 15 | 5 |
| | „ Rental of accounting machine by Ministry of Supply | 17 | 8 | 4 |
| | „ Air raid precautions : amount transferred from Property Rehabilitation Fund | 3 | 0 | 0 |
| | „ Yarrow Fund : amount of capital transferred* | 503 | 6 | 0 |
| *[3,429 0 4½]* | | £3,684 | 19 | 5½ |

### * YARROW FUND

The amount shown in the Balance Sheet is the balance of a gift of £10,000 received from Sir Alfred Yarrow in September, 1926, to be used 'as the authorities controlling the Association may think best in the interests of science,' without restriction other than that the capital as well as income must be expended within approximately twenty years.

# No. 2. Caird Fund

The unconditional gift of Sir James Caird, in 1912, administered by the Council in accordance with recommendations adopted by the General Committee in 1913.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investments at cost :* | |
| | £2,627 0*s.* 10*d.* 3 per cent. Savings Bonds 'A,' 1960/70 | 2,627 0 10 |
| | £2,100 0*s.* 0*d.* London Midland and Scottish Railway 4 per cent. Preference Stock | 2,190 4 3 |
| | £2,000 0*s.* 0*d.* Southern Railway 5 per cent. Preference Stock | 2,594 17 3 |
| | £2,716 16*s.* 6*d.* 3½ per cent. War Loan Inscribed Stock | 2,516 15 5 |
| [*Value of stocks at 31/3/45, £9,466 12s. 8d.*] | (Value at 31/3/46, £9,421 13*s.* 3*d.*) | |
| [*9,928 17 9*] | | £9,928 17 9 |
| | Cash at bank | £666 6 9 |

**EXPENDITURE**

| | £ s. d. |
|---|---|
| To Grants (see Schedule) [*265 0 0*] | 130 0 0 |
| „ Balance, being excess of Income over Expenditure for the year [*112 11 10*] | 227 17 10 |
| [*377 11 10*] | £357 17 10 |

Grants authorised, not yet drawn :—

| | |
|---|---|
| Mathematical Tables | £230 0 0 |
| Zoological Record | 50 0 0 |
| Seismology | 100 0 0 |
| [*280 0 0*] | £380 0 0 |

Note.—An account for approximately £75 for the printing of a second edition of Mathematical Tables, Volume I, was awaiting approval for payment at 31/3/46.

**INCOME**

| | £ s. d. |
|---|---|
| By Dividends and Interest | 265 17 10 |
| „ Income Tax recovered | 92 0 0 |
| [*377 11 10*] | £357 17 10 |

# No. 3. Cunningham Bequest

A legacy received by the Association in 1929 in trust under the will of Lt.-Col. A. J. C. Cunningham, for the preparation of new mathematical tables in the theory of numbers ; administered by the Council.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investments at cost :* | |
| | £1,187 6*s.* 10*d.* Consolidated 2½ per cent. Stock (Inscribed) | 653 0 9 |
| | £178 16*s.* 5*d.* Consolidated 2½ per cent. Stock (Registered) | 150 0 0 |
| | £300 0*s.* 0*d.* Port of London 3½ per cent. Stock 1949/99 | 216 0 0 |
| | £737 2*s.* 10*d.* Local Loans 3 per cent. Stock | 371 11 7 |
| [*Value of stocks at 31/3/45, £1,994 6s. 1d.*] | (Value at 31/3/46, £2,318 13*s.* 2*d.*) | |
| [*1,240 12 4*] | | £1,390 12 4 |
| | Cash at bank | £108 12 10 |

**EXPENDITURE**

| | £ s. d. |
|---|---|
| To carriage of plates of Mathematical Tables, Volume V [– – –] | 4 12 0 |
| „ Balance, being Excess of Income over Expenditure for the year [*62 6 0*] | 58 16 4 |
| [*62 6 0*] | £63 8 4 |

**INCOME**

| | £ s. d. |
|---|---|
| By Dividends and Interest | 58 3 4 |
| „ Income Tax recovered | 5 5 0 |
| [*62 6 0*] | £63 8 4 |

# No. 4. Toronto University Presentation Fund

A fund voluntarily subscribed by members present at the Toronto Meeting in 1924. From the income a presentation of two bronze medals each year is made, together with presents of books, to selected students in pure and applied science respectively.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investments at cost :* | |
| | £175 0*s.* 0*d.* 3½ per cent. War Stock | 178 11 4 |
| [*Value of stock at 31/3/45, £184 3s. 9d.*] | (Value at 31/3/46, £185 1*s.* 3*d.*) | |
| | Cash at bank | 28 17 6 |

**EXPENDITURE**

| | £ s. d. |
|---|---|
| To Balance, being Income for the year | 6 2 6 |
| [*6 2 6*] | £6 2 6 |

**INCOME**

| | £ s. d. |
|---|---|
| By Interest | 6 2 6 |
| [*6 2 6*] | £6 2 6 |

Note:—Owing to the war, the cost of the Medals and Prizes awarded for the years 1942-45 has not yet been met.

# No. 5. Bernard Hobson Fund

The bequest of Mr. Bernard Hobson, 1933; the income to be applied to the promotion of geological research; administered by the Council.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investments at cost:* | |
| | £50 0s. 0d. 4 per cent. Victory Bonds | 55 10 5 |
| | £601 9s. 0d. 3 per cent. Local Loans | 508 6 6 |
| | £416 0s. 11d. 3½ per cent. War Stock (Inscribed) | 436 3 1 |
| | £178 16s. 4d. Consolidated 2½ per cent. Stock (Registered) | 150 0 0 |
| | [*Value of stocks at 31/3/45, £1,070 15s. 6d.*] (Value at 31/3/46, £1,265 2s. 2d.) | |
| [*1,000 0 0*] | | £1,150 0 0 |
| | Cash at bank | £81 19 0 |

| EXPENDITURE | | | | INCOME | | | |
|---|---|---|---|---|---|---|---|
| | | s. | d. | | | £ s. | d. |
| To Balance, being Income for the year | 35 | 14 | 6 | By Interest | | 35 14 | 6 |
| [*34 12 2*] | £35 | 14 | 6 | [*34 12 2*] | | £35 14 | 6 |
| Grant authorised, not yet drawn:— Kent's Cavern | £5 | 0 | 0 | | | | |
| [*5 0 0*] | £5 | 0 | 0 | | | | |

# No. 6. Leicester and Leicestershire Fund, 1933

The unexpended balance of the local fund for the Leicester Meeting in 1933, presented to the Association, the interest to be used in assisting by scholarships or otherwise students working for the advancement of science; administered by the Council.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investments at cost:* | |
| | £487 2s. 11d. 3½ per cent. Conversion Stock | 500 0 0 |
| | £490 5s. 11d. 3½ per cent. War Stock | 500 0 0 |
| | [*Value of stocks at 31/3/45, £1,031 3s. 11d.*] (Value at 31/3/46, £1,048 5s. 4d.) | |
| [*1,000 0 0*] | | £1,000 0 0 |
| | Cash at bank | £40 5 0 |

| EXPENDITURE | | | | INCOME | | | |
|---|---|---|---|---|---|---|---|
| | £ | s. | d. | | | £ s. | d. |
| To Grants (see Schedule) | – | – | – | By Interest | | 34 4 | 2 |
| [*60 0 0*] | | | | [*34 4 2*] | | | |
| „ Balance, being Income for the year | 34 | 4 | 2 | „ Balance, being Excess of Expenditure over Income for the year | | – – | – |
| [– – –] | | | | [*25 15 10*] | | | |
| [*60 0 0*] | £34 | 4 | 2 | [*60 0 0*] | | £34 4 | 2 |

# No. 7. Property Rehabilitation Fund (incorporating balance of the Herbert Spencer Bequest Fund)

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investment at cost:* | |
| | £108 14s. 10d. 3 per cent. London County Consolidated Stock 1956/61 | 109 4 7 |
| | [*Value of stock at 31/3/45, £404 3s. 8d.*] (Value at 31/3/46, £113 1s. 10d.) | |
| [*400 0 0*] | | £109 4 7 |
| | Cash at bank | £34 15 5 |

| EXPENDITURE | | | | INCOME | | | |
|---|---|---|---|---|---|---|---|
| | £ | s. | d. | | | £ s. | d. |
| To General Income and Expenditure Account: Cost of Air Raid Precautions at Burlington House | 3 | 0 | 0 | By Interest | | 11 18 | 10 |
| [*32 3 3*] | | | | „ Income Tax recovered | | – – | – |
| „ Down House Income and Expenditure Account: Cost of Repairs at Down House | 204 | 14 | 4 | [*14 18 6*] | | | |
| [– – –] | | | | „ Balance, being Excess of Expenditure over Income for the year | | 195 15 | 6 |
| | | | | [*17 4 9*] | | | |
| [*32 3 3*] | £207 | 14 | 4 | [*32 3 3*] | | £207 14 | 4 |

# No. 8. Radford Mather Lecture Fund

A gift of £250 received from Mr. G. Radford Mather in 1936 to establish a Fund, the income therefrom to be devoted to meeting the expense of triennial Lectures on Recent Advances in Science and their relation to the Welfare of the Community.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investment at cost :* | |
| | £248 17*s.* 8*d.* 3 per cent. London County Consolidated Stock, 1956/61 . . . . . | 250 0 0 |
| [*Value of stock at 31/3/45, £252 12s. 3d.*] | (Value at 31/3/46, £258 16*s.* 9*d.*) | |
| [*250 0 0*] | | £250 0 0 |
| | Cash at bank . . . . . | £36 17 11 |

| EXPENDITURE | £ s. d. | | INCOME | £ s. d. |
|---|---|---|---|---|
| To Balance, being Income for the year . . | 7 9 4 | | By Interest . . . . . | 7 9 4 |
| | | | „ Income Tax recovered . . . . . | – – – |
| [*9 6 8*] | £7 9 4 | [*9 6 8*] | | £7 9 4 |

# No. 9. Mrs. E. M. Musgrave's Legacy

A legacy of £300, received in 1944, "for the development of biological research, with special reference to the investigation of the fresh water fauna of English lakes and to the grant of small sums to young research workers specially in need of financial assistance."

Cash at bank . . . . . £150

| EXPENDITURE | £ s. d. | | INCOME | £ s. d. |
|---|---|---|---|---|
| To Grant (see Schedule) . . . . . | 75 0 0 | | By Balance, being Expenditure for the year . | 75 0 0 |
| [*75 0 0*] | £75 0 0 | [*75 0 0*] | | £75 0 0 |

# No. 10. Arthur Haydock Bequest

A bequest received in 1945 "for the purpose of original investigation of problems relating to either or both of Geology or Botany as may be determined by the governing body of the British Association."

| | | £ s. d. |
|---|---|---|
| | *Investment, as received :* | |
| | £2,090 4*s.* 0*d.* 3½ per cent. Conversion Stock (Registered) . . . . . | 2,215 12 0 |
| | (Value at 31/3/46, £2,273 1*s.* 10*d.*) | |
| | | £2,215 12 0 |
| | Cash at bank . . . . . | £18 5 9 |

| EXPENDITURE | £ s. d. | | INCOME | £ s. d. |
|---|---|---|---|---|
| To Balance, being Income for the year . . | 18 5 9 | | By Interest . . . . . | 18 5 9 |
| [– – –] | £18 5 9 | [– – –] | | £18 5 9 |

# No. 11. Down House

In response to an appeal made in 1927 by Sir Arthur Keith, F.R.S., then President of the British Association, Mr. (later Sir) Buckston Browne, F.R.C.S., acquired the property of Down House, formerly the home of Darwin, and transferred it with an endowment of £20,000 to the Association as a gift to be held as a memorial to Darwin in custody for the nation.

*(Figures in italic type and square brackets, to the left of columns, are those of the preceding year's account, inserted for comparison.)*

| | | £ s. d. |
|---|---|---|
| | *Investments at cost :* | |
| | £3,000 Fishguard and Rosslare Railway and Harbours 3½ per cent. Guaranteed Preference Stock . . . . . | 2,139 17 3 |
| | £3,340 Great Western Railway 5 per cent. Consolidated Guaranteed Stock . . . . | 3,436 7 5 |
| | £2,500 Birkenhead Railway 4 per cent. Consolidated Stock . . . . . | 2,013 9 9 |
| | £7,944 2*s.* 4*d.* Consolidated 2½ per cent. Stock (Inscribed) . . . . . | 6,206 15 0 |
| | £5,971 16*s.* 11*d.* Consolidated 2½ per cent. Stock (Registered) . . . . . | 5,000 0 0 |
| | £2,444 15*s.* 10*d.* 3 per cent. Redemption Stock, 1986/96 (Registered) . . . . . | 2,500 0 0 |
| [*Value of stocks at 31/3/45, £24,399 2s. 4d.*] | (Value at 31/3/46, £25,284 17*s.* 10*d.*) | |
| [*21,204 17 8*] | | £21,296 9 5 |
| | Cash at bank and in hand . . . . | £223 1 2½ |

## No. 11. Down House (*continued*)

| EXPENDITURE | £ | s. | d. |
|---|---|---|---|
| To Wages of Staff | 845 | 2 | 7 |
| „ Rates, Insurance, etc. | 94 | 7 | 9 |
| „ Electricity | 49 | 17 | 2 |
| „ Fuel, etc. | 125 | 5 | 9 |
| „ Drainage | 40 | 2 | 2 |
| „ Water | 18 | 18 | 8 |
| „ Repairs and Renewals | 204 | 14 | 4 |
| „ Land and Garden: materials and maintenance | 76 | 10 | 2½ |
| „ Donations to village institutions | 5 | 5 | 0 |
| „ Household requisites, etc. | 11 | 19 | 7½ |
| „ Furniture | 42 | 7 | 6 |
| „ Transport and carriage | | 17 | 5 |
| „ Printing, postage, telephone, stationery | 63 | 11 | 4 |
| „ War Damage Contribution | 2 | 1 | 9 |
| „ War Damage repairs carried out | 50 | 7 | 5 |
| [*1,029 19 7*] | | | |
| „ Balance, being Excess of Income Expenditure for the year, transferred to Suspense Account | – | – | – |
| [*109 14 0*] | | | |
| [*1,139 13 7*] | £1,631 | 8 | 8 |

| INCOME | £ | s. | d. |
|---|---|---|---|
| By Rents receivable | 141 | 19 | 4 |
| „ Income Tax recovered | 373 | 10 | 0 |
| „ Dividends and interest | 546 | 18 | 6 |
| „ Sale of postcards and photographs | 2 | 5 | 8 |
| „ Transfer from Property Rehabilitation Fund: for repairs | 204 | 14 | 4 |
| „ War Damage claims paid | 69 | 6 | 6 |
| „ Donations received | 1 | 1 | 3 |
| [*1,139 13 7*] | 1,339 | 15 | 7 |
| „ Balance, being Excess of Expenditure over Income for the year, transferred to Suspense Account | 291 | 13 | 1 |
| [– – –] | | | |
| [*1,139 13 7*] | £1,631 | 8 | 8 |

## Schedule of Grants Paid to Research Committees, etc.

### during the financial year to March 31, 1946

NOTE.—The year indicated in brackets after the title of each committee is that of its original appointment, and the sum, if any, is that previously expended out of grants by the Association.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| 1. PAID OUT OF THE CAIRD FUND | | | | | | |
| Plymouth Laboratory (1886: £1,748 10*s.* 8*d.*) | 50 | 0 | 0 | | | |
| Zoological Record (1923: £1,035) | 50 | 0 | 0 | | | |
| Algæ and Protozoa (1939: £150) | 25 | 0 | 0 | | | |
| Mathematical Tables Committee* | 5 | 0 | 0 | | | |
| | | | | 130 | 0 | 0 |
| 2. PAID OUT OF THE MATHEMATICAL TABLES FUND (1934) | | | | | | |
| Mathematical Tables Committee* | | | | 5 | 0 | 0 |
| 3. PAID OUT OF MRS. E. M. MUSGRAVE'S LEGACY (1944) | | | | | | |
| Freshwater Biological Station (1930: £1,087 15*s.* 11*d.*) | | | | 75 | 0 | 0 |
| 4. PAID OUT OF THE CUNNINGHAM BEQUEST | | | | | | |
| Mathematical Tables Committee* | | | | 4 | 12 | 0 |
| | | | | £214 | 12 | 0 |

* MATHEMATICAL TABLES (1913)

Total grants paid to March 31, 1946:—

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| From Cunningham Bequest | | | | 2,840 | 10 | 11 |
| „ Caird Fund | | | | 1,297 | 8 | 2 |
| „ Mathematical Tables Fund | | | | 192 | 16 | 0 |
| „ General Fund | | | | 415 | 17 | 6 |
| „ Royal Society Grant (1933) | | | | 50 | 0 | 0 |
| | | | | 4,796 | 12 | 7 |
| Amount recovered by sale of tables | 543 | 12 | 6 | | | |
| Amount recovered by hire of accounting machine by Ministry of Supply | 262 | 10 | 0 | | | |
| | | | | 806 | 2 | 6 |
| | | | | £3,990 | 10 | 1 |

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